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FOR THE

ARCHITECT, ENGINEER, ARCHÆOLOGIST, CONSTRUCTOR, SANITARY REFORMER, AND ART-LOVER.

CONDUCTED BY

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"Every man's proper mansion-house, and home, being the theater of his hospitality, the seate of selfe-fruition, the c of his own life, the noblest of his sonne's inheritance, a kinde of private princedome, nay, to the possessors thereof, an whole world, may well deserve, by these attributes, according to the degree of the master, to be decently and delightfully

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The Builder

Eighteen Hundred and Seventy.

WITH our last number we completed the twenty-seventh yearly volume of the *Builder*, more than twenty-five of which have been issued under the direction of its present conductor. We were then alone. If imitation be, as some have said, the most refined shape of flattery, we certainly have reason to feel flattered. We have pursued our path with heart and will, furnishing an amount of information which may be more rightly estimated looking back through all our volumes, than week by week. Where error needed exposure, or adverse opinions were necessary, we have never flinched from the truth; dealing tenderly, nevertheless, we hope, with those with whom we may have differed. As we have done so we will do. We are too old in the service, and too fully persuaded that we possess the sympathies of our public, to consider fresh professions necessary.

The year 1869 will long remain memorable as having been marked by some of the most remarkable triumphs ever effected by the engineer, the architect, or the builder, since the close of the Great Roman Imperial Period. The strongest impulse given to monumental construction by the pride, the piety, or the military energy of the greatest sovereigns who have arisen in Europe since the Gothic invaders swept away the last relics of the degraded Roman Purple, has never produced, within so short a time, works of such unprecedented magnitude, as the co-operative, commercial, hopeful effort of the decade now closing has originated, carried on, or completed. And while the results of the power and the resolution of those royal and sacerdotal founders who have reared the noblest edifices of Christian times have been strictly and exclusively national, the works inaugurated by the spirit of the age have put a girdle round about the earth. It took a succession of pontiffs, and a series of architects, to rear that mighty dome under the shadow of which 670 bishops are now assembled, in order to perform, if they do as they are bidden, the most comprehensive act of self-immolation which the world has yet witnessed. The Escurial, the Palace of Versailles, the wonderful creations of Mafra—the palaces, the churches and the fortresses, that recall the names of the greatest monarchs who have reigned over the respective countries which those edifices adorn, exert a certain influence on the culture and the convenience of Europe. But the piercing of the mountain barrier that forms the back-bone of the American continent by a railway that brings the Atlantic sea-board into organic relation with the coast of the Pacific, and the cutting through of that thirsty tongue of shifting sand, over which the legislator of the most ancient nation that yet preserves its individuality, though dispersed over all the regions of the earth, led the tribes which he formed into an army and a state, are events which have a direct interest for the entire human race. Mighty as are the changes which even our eyes have seen since Stephenson first turned the escape steam of the boiler into the chimney of his locomotive,—merely to get rid of that superfluous vapour, to the dying energy of which he afterwards found that he was mainly indebted for the speed which his iron horses attained,—they may prove to be as nothing in comparison with those now looming in the future.

The year 1870 opens, indeed, under unusual auguries. The long-continued doubt, suspense, and dismay which have so long possessed the minds of men accustomed to industrial enterprise, seem to have reached a climax. If men are not convinced that great changes are imminent, it can only be because they have lost the power of expectation. At least, it cannot be denied that many long-open questions are now closed or closing; that many sources of hesitation are removed; and that the outcome of a future as to the course of which the past can furnish but little reliable guidance is more and more clearing itself from the mist.

The year 1869 has not fulfilled the hopes and the desires of all those interested in public enterprise by the revival of public faith. On t' contrary, so long has been the stagnation foll' ing the commercial tornado of 1866 that sor the most hopeful, as well as the most though men are beginning to put the question, enterprise ever revive? Have we enter secular period in which no man will neighbour? Are our canals all cut ways all constructed; our ports and perfected; our cities enlarged beyond the demands of their i- inventive faculties discourage ordinary, so that there is not any spare money that b squaring up the account risk it as an investme quick-sand of foreign

It is true that, a few weeks since, a mo cheerful feeling was prevalent in the great centre of financial life than we can remember for the past three years. The fit was transient, and the alarm of those who, in busier times, gave life and vigour to speculation, or to whom the paternity of prospectuses might be ascribed has, perhaps, culminated with the arraignmen before the Lord Chief Justice of the once fabu lously honoured potentates of the discoun market. The ringing cheers which welcome the close of this long-vexed question may, per haps, have had a more real excuse th critics of the press have yet allowe applaud the clear delivery of justic venerable magistrate would be, no solecism. To hail the acquittal from t charge of the very men who, a f months before, were saluted on their p committal for trial by every form of ex and every varied dissonance of catcalls at the first blush, but a fresh exampl easoning caprice of the mob. And and not altogether reprehensible have sought an instinctive vent in and the cheer. That enforced idl worse than almost any sacrifice past toil, found voice on the On the latter, it is far from i hope that with the clear stat law of association really co destruction of all vague the the uneasiness which h paralysis might be reli a very hearty cheer individual fate of t Discount Company indifference.

In speaki we took oc would b remark tryin tenc on'

…ystem of the *Société* …hich appears to us to be …ned for at… …ent. It may be long before the exact method of obviating the dangers which now deter men from all joint-stock enterprise is hit upon. Once found, however, there is little room to doubt that the disposition to make use of it will be so developed as to change the face of affairs, and restore activity, at any rate, to Great George-street.

In the meantime the facilities for conducting business of all sorts in the metropolis have, during the outgoing year, been notably increased. The transfer of the telegraphs to Government, which, though not yet accomplished, has been legalised within the period under review, can hardly fail to give a great stimulus to business of every description. The opening of further sections of the Metropolitan Railway has tended to enlarge the area available for business residence, and to economise the time of all those who reside in the localities served by the circular route. From Westminster to Kensington, and so round to the Edgeware-road, and to the City, the communication is now extremely convenient. The complaints made in our pages as to the bad atmosphere of the tunnels have met with due regard; and, although it is very much to be regretted that the up and down traffic is not led through separate tunnels, in which case good ventilation would be almost or quite effected by the mere passage of the trains, still London derives a great and increasing benefit from the subterranean channel of traffic. The completion of the line to Blackfriars may be expected at no very distant time. The absolute necessity for the continuance of the railway towards the Mansion House, and the Tower, and so round again to Moorgate-street, will become only more apparent when the line is opened to Blackfriars; and the formation of a line from …r-street to Charing-Cross is one of those *…rata* the fulfilment of which is only a ques… time.

…opolitan improvement has not been con… railway extension. We have been active …e sky as well as under the earth. The …ving nuisance of Holborn-hill has been … Making every allowance for any error …l, a well-considered, adequate, picturesque … has replaced that old Waterloo of the …orse-master, and the flood of traffic now …quilly over the level platform with an …onomy of time and of cost.

…onoured with its presence the open… …ow Blackfriars Bridge, and proceed… …er Majesty was the first to make …duct over the valley of the Fleet. … these two great bridges, the foot… …river Embankment has been …e public. The too-long delayed …ropolitan Extension Railway …pening of the river side car… … the formation of the park … reach from Charing-cross …n the limited and inter… … is now accessible to …reat boon to all those …o pass from West… …questions as to the … piers and stair… …est themselves …o doubt can … work in the …h a river, … Naples to … fringes …d pro… … will …om…

becoming, to some extent, recognised by public opinion. Education in matters of taste is somewhat on the advance. On the other hand, we have to deplore a movement in the opposite direction in Government quarters. As if to discredit the efforts made by the more enlightened portion of the press in favour of the establishment of a permanent administrative Department of Public Works, a Commissioner of Public Works has unfortunately taken a pride in saying what would lead to the impression of his own entire unfitness for the office. Let us hope that his acts will be better than his words, and he may even now prove more valuable than his predecessor, Mr. Layard, whose words were a great deal better than his acts. The chief result of his rule was delay in every quarter.

Our readers have, from time to time, been made acquainted with the progress and the never-ceasing activity of the noble educational establishment at South Kensington. The Amphitheatre of London, of which we gave an account,* is slowly advancing towards completion. Preparations for the arcades destined to shelter the permanent International Exhibition are in progress. This artistic and industrial centre, to which access is now readily afforded by the Metropolitan Railway system, is one of the brightest spots on which the eye can rest with satisfaction, in glancing at our public institutions.

We have also to remind our readers of the sharp archæological controversy which arose on the first experiment on cleaning the bronze monuments in Westminster Abbey. The remark of the Dean of Westminster, to the effect that he had a double duty to discharge, that of conservation and that of exhibition, and that the two duties seemed at times to clash, may be taken as a summary of the entire dispute. The work of cleaning has gone steadily on—not, perhaps, without occasional mishaps, but, on the whole, to the advantage of the most regarded of our national sanctuaries.

The past year has also witnessed preliminary steps towards the formation of that great requirement of the City and of the country, a National Armoury. The admirable, though limited, collection of Sir S. Meyrick has been exhibited, on loan, at South Kensington. The very interesting historic series at the Tower of London has been carefully rearranged by the most competent hand; and the director of the South Kensington Museum has embodied in his last annual report the recommendation of the *Builder*, that the contents of these two fine museums should be fused into a national collection, worthy of the name. Even if that be not done, the collection already belonging to the nation should be confided to proper hands,—say those of the gentleman who has just now put it into artistic shape,—so that it may be rightly maintained and judgmatically added to as occasion serves. Unlike some other institutions, it will provide ample funds for its own development.

Glancing from the metropolis itself, we are remipded that the first day of 1870 is to witness the abandonment by the directors of the Brighton Railway of that blind and suicidal policy which has caused such a sensible reduction in their receipts, and against which we have so persistently raised a warning voice. We observe within the present week that the Metropolitan Railway directors have also placarded a great reduction of fares. While the effect of a grasping and selfish line of conduct has been the destruction of legitimate traffic, we cannot be surprised to see, in other directions, attempts to galvanise railway travelling into unnatural activity. Among them must be ranked the schemes, no further advanced than on paper, for tunnels, bridges, embankments, and floating or …unken tubes across the Channel. In dealing …th these undesirable follies, the *Builder* used … most unpardonable weapon—the sarcasm of …ctical truth. Our daily contemporaries re…duced our observations, and some of the …ates of the tunnel schemes attempted a …hich we have little doubt that they sub… … regretted. The subject of proper … and proper ports for the French and …ffic is one that now rightly engages …

… Eastward, on the route to India, …ailway over Mont Cenis has been …ly snow. The Italian half of …nnel is reported as complete; … engineers are still driving …h portion of the work. The

degree of accuracy with which, as will hereafter be proved, the line has been run from each end, both as to direction and as to level, will be a matter of the utmost interest to ascertain on the meeting of the headings.

Dropping down the Mediterranean to the mouth of the Nile, the month of November witnessed that which has been the most signal triumph of indomitable energy of which modern engineering can boast. Through good report and through evil report the Chevalier de Lesseps has held on, until the Imperial and Royal guests of the Egyptian Viceroy were able, on the fixed day, to steam from the Mediterranean to the Gulf of Suez. England, of all countries in the world, has the most reason to rejoice that the mistrust of this great undertaking has proved, to so great an extent, to be unfounded. Much, no doubt, remains to be done; but M. de Lesseps has given us excellent reasons for placing some reliance on his word. The expense of dredging, of walling, or of widening certain portions of this marine highway will, no doubt, yet be considerable. But M. de Lesseps states that 80,000 tons of shipping passed through the canal within ten days from its opening. Such a statement is more than a promise,—it is an earnest,—of an adequate income. A profound modification of our marine commerce must follow the general recognition of the capabilities of the Suez Canal.

On the opposite side of the globe, a work of nearly equal importance has been accomplished. The more detailed accounts of the Great Railway across the American continent are such as to confirm our first impression as to the rough and ready mode of its construction. In fact, it rather resembles what we should call a contractor's road than a main trunk railway. Wild stories, too, are told of the construction of many miles of the road in duplicate, in the race between different districts, to secure the Government subvention. But we must remember that in America the railway is the pioneer of civilisation. With ourselves it is the rear guard of social progress—with our Transatlantic cousins it is the van. Indeed, such an enterprise as that to which we refer, may rather be spoken of as the forlorn hope of the settler. We must not forget that there are railways and railways, and that our Parliament-enforced method of building every branch with the strength and dimensions proper for a main line, is a far more wanton waste of money than is involved in the slight and rapid fabrication of a route which will require continual repairs, and perhaps ultimate replacement. Light railways must be made in our own country. Our readers will no doubt remember our repeated observations on this highly important national requirement.

We cannot but recall, with extreme satisfaction, the fact that the Horse Guards have at length given due attention to a subject which, from the date of the battle of Sadowa, has received the unfailing advocacy of our columns. That every soldier should be taught so much of the duties of a sapper as to enable a commander to provide immediate cover from fire for his men, on the moment of their seizing an exposed position, has appeared to us to be a requisite of the very highest national importance. We cannot think that we have regarded the subject too much from the stand-point of the civil engineer. Our labours, public and private, on that subject, have been earnest and persistent, and we rejoice to see that due attention has at last been called to the education of the troops of the line in the exercise of the strictly defensive art of using the pick and the shovel.

Our knowledge of the earliest and rudest stages of the art of the builder has been considerably enlarged, during the past twelvemonth, by the Abyssinian photographs taken by the Royal Engineers under the command of Lord Napier of Magdala. Light as to the character of those megalithic circular buildings which, in our ignorance of the date of the race of their pre-historic builders, we call Druidical, has been obtained by a comparison with the very similar forms of the round Abyssinian churches. In the stronghold of Theodore himself, we have seen that, under the skies of Africa, a hut may be synonymous with a palace.

We must not omit a word of seasonable greeting to Lieutenant Warren (though he seems to us to want good advice also), whose labours, on behalf of the Palestine Exploration Society, have elucidated several points connected with the topography of Jerusalem. At this seasonable time of Christmas, the mind reverts with unusual interest to the most striking of the relics

exhibited, by this association, at the Egyptian Hall; where, hard by a pile of the stone bullets hurled by the engines of Titus, is to be seen a carved and charred fragment of cedar, a portion of the roof of one of the temple cloisters, if not of that very "Solomon's porch" in which One whose birth we now commemorate walked, when "it was at the feast of the dedication, and it was winter."

Amid all the hesitation of the year, it is refreshing to find that the efforts to give ennobling and improving pleasures to the people have neither flagged nor failed. Day after day, through the week preceding Christmas, the largest halls in London have been densely packed with auditors of the Grand Protestant Oratorio,—the Messiah. And 2,035,000 visitors have, during 1869, passed the turnstiles of the Crystal Palace.

The vital importance of the question of education, both primary and technical, is beginning to be felt. We shall continue to urge it as we have long done. The special education of the architect will, of course, be promoted in our pages,—*cela va sans dire*. So, too, with sanitary reform and the great questions of public health and social economy. The past part played by the *Builder* in these fields is so well known as to render any allusion to its future course in those directions unnecessary.

We must be pardoned for one word more, and that not in the character of the architectural critic, but in that of the journalist. It is simply a matter of due courtesy to acknowledge the frequent citations from our columns made by our contemporaries, throughout the empire, of every political colour, as well as occasionally their comments. It is for no mere personal reason that we refer to the subject, but because we hail the evidences thus afforded of the agreement between views we may have long laboured to express, and the opinions of the most influential members of our great literary guild. A weekly journal does not rely, like a daily paper, on the piping-hot novelty of its intelligence: it is rather as being able to treat those events which come within the scope of its pages with judicious clearness, than as always giving the first hint of the occurrence, that a journal like our own must make its mark. And we rejoice to see those of our fellow-labourers who have to consume the midnight oil for the enlightenment of the breakfast-table of their readers thus distinctly recognising our own, as well as their own, proper province.

The year opens with gravity, yet with solemn hope. The past year has brought us no great national catastrophe. It has done much to clear away the wreck of former disasters. If our horizon is not unclouded, it yet constitutes the brightest part of the political heavens. France is in the throes of revolution, as yet bloodless, demanding the end of personal government. Germany is leaning on her sword, and breathing before she attempts to complete her unification. Rumours of disquiet echo from Russia. Spain has established a permanent "provisional" Government, and has enthroned the *pronunciamento*. In Portugal the octogenary marshal Duke of Saldanha—a field-marshal of fifty-five years' seniority, seems threatening to throw his sword into the scales which weigh the absolute corruption of the country. In Italy the usual ministerial crisis continues, with little intermission, and will continue so long as the harpy flock of *impiegati*, military and civil, fatten and rot while consuming the vitals of the country. In almost every instance the foreign fundholder is paid his dividends out of a fresh loan, invented, under some clever name, for the purpose. How long Englishmen will send their money to these foreign quicksands, while we have room for its employment in the application of chemistry and of mechanics to agriculture; in the construction of branch light railways; in the reclamation and working of land; in the utilisation of the wasted wealth of sewage; in the creation and the working out of the many new industries which the advance of science daily renders possible, it is not for us to say. But whatever doubt as to the future there may be room for at home, our island seems a perfect oasis of light and tranquillity compared with almost any other terrestrial region. With stout hearts and cheerful outlook we welcome the year 1870.

Rouen Cathedral.—A monument, in memory of Richard Cœur de Lion, has been erected here in the choir, and his heart has been placed in it.

THE PURPOSE AND PROGRESS OF ARCHITECTURAL SOCIETIES.

THE frequent combination of a number of persons into an associated body, for the purpose of mutual assistance and information in pursuits which could not be so thoroughly carried out by individuals, is (to use a phrase now becoming common) a "note" of what may be called *par excellence* intellectual civilisation. The mere numerical combination of brute force for purposes of attack or defence may, of course, exist in a state of society barely raised above animal life; and combinations for the carrying on of trade to the best advantage do not necessarily imply more than what may be termed a state of physical civilisation, generally entirely self-interested in its origin. But associations for the purpose of mutual information and assistance in intellectual pursuits stand on a somewhat different footing. Not only does their existence imply a far higher mental status of society than any merely commercial union: it implies also a higher moral status, presupposing the recognition of that enlightened and unselfish standard which regards all knowledge and ability, howsoever attained, as something to be used for the good and advancement of society generally, not to be hoarded and made much of by its fortunate possessor as a kind of *point d'appui* for gaining an advantage over his fellows in the race of life. And though, of course, it may be said, and justly, that all which contributes to the general advancement of society contributes also in the end to that of each individual member, and that this is consequently but an enlightened form of self-interest, it may nevertheless fairly be urged in reply, that no such intellectual combination can be efficiently carried out and brought to important practical results, without involving, in the first instance, a considerable amount of individual self-abnegation, besides a notable casting out of the old evil spirit of professional jealousy, one-sidedness, and party feeling, which has been such a sad blot upon the annals of some of those which are specially spoken of as "learned" professions.

So far, then, as the theory of scientific and artistic societies is concerned, their multiplication should be an entirely good omen, anguring an increasing mental activity and an enlightened sense among us of the responsibility of individuals towards society at large. And we should be far from saying that there is not a large proportion, perhaps a majority of such associations, wherein their true scope and value are practically recognised by their members, and which are doing good and energetic work in the general cause. In all probability, in spite of isolated facts having a contrary bearing, this is most especially the case with societies which are rather scientific than artistic, and where the results aimed at, though calling for a high degree of cultivation on the part of the workers, are rather of a practical and physical than of a mental or æsthetic nature. In such societies the gaining of the widest possible information upon all details connected with their special subjects is a tangible and recognised end, almost indeed a *sine quâ non*; and when the success of each individual depends not only upon his own talents, but also upon experience and knowledge beforehand of all the possible conditions under which he may have to work, there is the less room for professional jealousy, and the more inducement for a free interchange of experience, which may be of equal value to all parties. It is when we come to associations which have art as well as science for their object, that we have less reason to feel entirely satisfied as to the extent to which they are really made valuable for the advancement of their members. The objects of an association for the advancement of any art are less tangible and less easily defined than in the case of more purely practical pursuits; besides that artists, proverbially an *irritabile genus*, have more tendency, if not more reasonable ground, for personal rivalry and jealousy of one another. It is one thing to communicate to others facts external to yourself, the knowledge of which is gained by simple observation and experience; it is another thing to place them in possession of your own innate ideas and conceptions, to be plagiarised, possibly, by those who are themselves deficient in originality.

Is it in any degree owing to such a feeling that architectural societies, which in a great measure are, so far as their prospectuses take us, art societies, have done less for the advancement of their special art than is at all proportionate to the extent of the machinery set in motion to that end?

We should be sorry to have to admit the general existence among us of so unamiable a quality as professional selfishness: the feeling which leads a man to be content if he "gets on" himself, without any consideration as to the general advancement in the practice of the profession. That there are instances of this, and that architects are not always unwilling to seize opportunities, at sundry times and in divers manners, for damning each other with (or without) faint praise, must, we fear, be conceded. But a great deal of the practical disunion which exists may be traced also to the prejudices so deeply rooted by the Battle of the Styles, the clamour of which is now beginning to die away in the distance, but which has left its results behind it. Whether from these or other courses, however, there is scarcely that unity either among the architectural societies of the kingdom themselves or among individual members of each society, which we could wish to see, and without which the value of such societies would exist rather upon paper than in reality. Even in the central and leading professional body, where at least we ought to expect a judicial and unprejudiced treatment of the principles and practice of the art which it represents, we had not long since practical proofs of the determination of one party therein to set the battle in array against another, in a manner savouring not altogether of breadth and comprehensiveness of artistic feeling. And with regard to provincial societies, the case is becoming a somewhat common one, so far as we can learn through occasional reports. We had occasion the other day to comment in these columns on the formation of a new Northern society in a district where another already existed. We heard some time since of a Midland society, which, having been formed for two or three years without accomplishing anything, was about to be given up again as a bad job, and was only saved *in articulo mortis* by the heroic undertaking of one or two members to contribute something in the way of communications to meetings apparently few and far between. Whether in this case promise blossomed into performance we never learned. In one large town we hear of two opposition societies, one of which, however, seems to confine its energies mainly to simply existing—*stat nominis umbra*. In another, where a tolerably active association has existed for a good many years, several attempts have been made to get up an opposition society, one of which was, if we were rightly informed, strangled in its cradle by the rash proposition of a *pro tem.* committee-man, that each member should bind himself never to accept a commission from a tradesman; a pinnacle of virtue which the remainder, *nati consumere fruges*, were no wise prepared to mount to. In almost all these cases of divided societies in the same town, or of divisions in one society, it is almost impossible not to conclude that the state of things is the result of feelings the reverse of praiseworthy, either morally or intellectually. Were the real object of all the promoters of such societies the advancement of the art of architecture, and of the dignity of the profession, it is almost self-evident that they would have everything to gain in this object by union, and a great deal to lose by division. But, in fact, the state of things is often very much after this manner:—A is disgusted with that conceited fellow B, who is cutting him out of part of his practice; C, who is a mediævalist *enragé*, and makes designs for devils on blotting-paper, is willing to read papers of his own to any extent; he knows their value; but as for coming to listen to that old woman D, who talks about "principles of art," and who has never read Ruskin, he has something better to do with his time, thank you. E really cannot undertake to meet such men as F and G, who drop their H's; and there are unknown quantities up to X, Y, and Z, who are quite willing to see all societies whatever consigned to the Limbo of Vanity, provided their own solid and comfortable business in arbitrations and surveys be not interfered with; and others, who with great show of professional ardour complain that the society accomplishes nothing, and that it is not worth their while to attend its meetings, forgetting that the very condition of accomplishing anything is the active cohesion and co-operation of all concerned. And so it happens that associations, formed with the best intentions, and with every primary prospect of success, are allowed to lapse into meetings of certain cliques or parties, who run

the same round until they are tired of each other, without benefiting either themselves or any one else.

We have said that, when rightly carried out, the formation of associations for mutual assistance in high-class pursuits is both laudable in principle, and cannot but be beneficial in practice. Nor is there, as we believe, any pursuit or profession more open to advancement by means of such associations than that of architecture. The subjects with which architects are expected to be more or less conversant are now more numerous and varied than ever; and though one man can never really master all of them, it is almost necessary that he should have some acquaintance with all: indeed, it may be said that there is scarcely any branch of knowledge, an acquaintance with which may not at some time or other be beneficial to an architect, whose profession touches at so many points on what is accessory to the comfort or the beautifying of life. It is precisely in furnishing the means of thus generalising knowledge, of gaining experience from a larger area than can be covered by any individual mind, that architectural associations may be made in the highest degree useful; may, indeed, be said to be almost indispensable. But let those who belong to, and those who are engaged in forming such associations, look well to their motives and objects. Projects which have once been found useful sometimes become a fashion, and are imitated inconsiderately and uselessly for fashion's sake. It is wasting time to get up a society merely because another town has one, and you will not be outdone; it is worse than waste of time to set one up out of spite and in a spirit of opposition to other members of the profession. It should be distinctly understood, in getting such an association into work, that its *bonâ fide* object be to facilitate and advance the study of architecture among its members, and raise the status of the profession. To promote friendly intercourse among members of the profession in the same locality is of course an object not to be despised, but not in itself worth starting and sustaining a society for, as an ordinary club would answer this purpose equally; and it is necessary always to guard against allowing an institution set on foot for serious professional purposes to descend to a state of mere complimentary speech-making and dinner-giving. Nor is it sufficient that there should be a series of what are called "papers" following each other at regular intervals. Those who are charged with the conduct of our professional societies should see that what is brought forward is of some practical value; and not allow time to be wasted, and the status of their society to be lowered by the reading of papers written *currente calamo* to supply a gap, and containing, perhaps, ill-digested rambling dissertations on nothing in particular, or on things of no real consequence, flavoured by spasmodic attempts at wit. Architectural wit, we are bound to confess, seems to us for the most part to be of a very watery nature, if we may judge by specimens which have come before us in print and in MS. What is to be demanded of an architectural society is that it should be really made an opportunity for communicating valuable information on the practical subjects of the profession, and for promoting interchange of ideas as to the principles of design in art. The exhibition by members of drawings of the works which they have in progress, or are contemplating, for friendly criticism by their fellow-workers in the same field, might often prove of great value, and even do something towards producing and fostering somewhat more of unity of style and principle among our designs than is now perceptible. And if by such a proceeding, too, any inroad be made upon that hurtful and unworthy feeling of professional jealousy of which we have too often evidence, if architects be got to think that their duty should be not to cut out Smith or Jones, but simply to see that the work is as well done as it possibly can be, and to accept and take into consideration all friendly criticism given with that end, then, indeed, architectural societies will have achieved a great and good work. But they will not achieve this by the formation of cliques and the maintenance of party spirit; nor should they even be permitted to become exclusive advocates, in a party manner, of this or that method of design. Their true object should be to prove all things, and to keep to that which is good; and for such a body to declare themselves bigoted adherents of Gothic or Classic, or any other "ic," is voluntarily to retire from the field where they would be of most use, and to set themselves up as the champions of idle and hastily caught-up fashions, instead of investigating and elucidating the broad and permanent principles of the art which they profess to advance.

THE STATUES OF EASTER ISLAND.

THE account of Easter Island and its statues, as lately told in our pages by Mr. Martin Tupper, in consequence of the arrival in this country of some of the figures,* has scarcely excited so much attention out of doors as it properly calls for. The facts are so remarkable, and the mystery surrounding them so great, that we are prompted to place before our readers all the materials available for forming a judgment on the points in question. By the kindness of Lieut. Harrison, we are enabled to give a sketch plan of the island, a view of part of it, with its marvellous grove of gigantic heads, and a representation of one of the recumbent figures, with the singular tufa crown, to which reference has before been made. To these we add representations, back and front, of the two figures brought from the island, and now in the British Museum.†

Contemplate the broad fact for an instant. Here on this barren island, not thirty miles round, in the midst of the vast Pacific Ocean—an island, treeless, metalless, and foodless, occupied by a few wretched savages, and 2,500 miles from its nearest continental neighbour,—more than 300 of these stone statues, 20 ft., 30 ft., and in at least one case 50 ft. high, some of them standing on long platforms of Cyclopean masonry, have been counted, and how many more there may be in the interior is not known to us. When and by whom were they made? The people now inhabiting the island know nothing of their origin or purpose, and take no interest in them: they have no tradition even of the extinct people by whom they were raised. Transported from other lands, as things now are, they could not have been. Is there any other mode of explaining their existence than by the belief that Polynesia was once a continent,—a submerged continent and an extinct people;—that we have here another,—

> "Lyonnesse—
> A land of old upheaven from the abyss
> By fire, to sink into the abyss again;
> Where fragments of forgotten peoples dwelt."
> TENNYSON.

A submergence of vast tracts of lands similar to that suggested with reference to Easter Island probably took place in the Atlantic. Scholars will remember the tradition in Plato's dialogue, entitled "Timœus," making direct mention of a great Island of Atlantis, situated beyond the pillars of Hercules. On this extensive Atlantic island there was a powerful kingdom. In an evil day, he writes, this island sank into the ocean. Professor Unger, of Vienna, in a valuable lecture on this sunken island of Atlantis, of which a translation is published in the *Journal of Botany*,‡ gives very interesting evidence in favour of this tradition from the flora and fauna, and in support of the theory that, "in the Tertiary period, or when lignite was formed, Europe must have been connected with North America, and the Atlantic ocean must have been divided at one place or another by a continent." The continental connexion of Australia and Europe during the Eocene period is argued for.

No metal nor even flint is found on Easter Island, but only some hard stones, capable of being fashioned into so-called celts. Were these figures produced with such instruments? The workmanship is rude, but not bad. Some description of those in the British Museum, and now illustrated by us, we have already given, and need not repeat it. Observe the excellent conventional treatment of the arm and hand, and of the jaw and chest in the larger figure. The ears (if they are ears) are very peculiar. The carving on the back of the smaller figure, tufa, is very remarkable; the band in the larger figure is clasped in the two hands. The receding forehead and projecting mouth are very striking. The tufa crowns are also singular, and are in many cases 6 ft. high, and 5 ft. in diameter. These must have been placed on the top of the statues after their erection,—not an easy task.

An esteemed correspondent, an artist, who went to the museum to see these figures, in consequence of the papers in our pages, is disappointed with their rudeness. He writes,—"As these frightful idols stand in juxta-position, under the portico of the Museum, with by no means the finest specimens of Grecian art, the contrast is something remarkable, and to be noted; for we may at once see that it is needless to lament the absence of any other records of the people who produced them, for 'Barbarian fecit,' is clearly and unmistakably incised in characters easily to be deciphered by the educated, artistic eye. There is no kind of information which a man would not rather have than not, if it could be obtained by the mere wish; but as there is nothing to be told about these frightful stones except that 'there they are!' and from intrinsic evidence that 'they were hewn by savages,' we may be content. For if the *submergence theory* be correct, as doubtless it is, we may regard the drowning of that continent, and the preservation of these monstrosities as wise decrees of Providence; showing in the one case that that continent was an unfruitful field, and by the remains that the submergence was just."

Our correspondent takes for granted the very point that is in question, a point of the deepest interest, and to the settlement of which the presence of these statues brings strong evidence. Even from the art point of view they may prove important links in art history.

It does not seem certain that we may claim for these figures a very high antiquity: they are very Mexican in appearance, and their age may be not greater than that of the ruined cities of Central America, of which we know. The submergence might have taken place in the Middle Ages, without any intimation of the momentous occurrence reaching us. They may, however, be very much older. Anyhow they represent a most extraordinary phenomenon, and present very curious questions for consideration. We can recall nothing more remarkable than the view we now give of part of the island, with its growth of statues.

* See pp. 930, 982, vol. xxvii.
† See p. 10. ‡ Vol. iii., p. 13, &c.

INSTITUTE OF PAINTERS IN WATER-COLOURS—WINTER EXHIBITION.

AT this season, when geniality and courtesy are expected to prevail, it would be churlish indeed to be ill-naturedly critical in regard of any means offered for intellectual amusement; and besides, drawings, sketches, and studies abound to such an extent just now, and such a wide average of merit obtains amongst them, that there is little room for anything but in praise to be said of them: so the best notice is one of where more are to be seen, and to invite inspection. It would be difficult to say anything new of some of the very best of them, and quite unnecessary to call attention to shortcoming where no attempt has existed at perfect performance, in the worst of them.

As the bells ring the changes, time being money, let us hope, as a harmless swindle, that we have passed the bad for the good; and for the good of everybody this happy new year; and if the prosperity of art is any real index to a general state of things, that picture exhibitions—winter and summer — may increase and multiply until they become too numerous to admit of particular notice: a kind wish to more than the painters.

The "supplementary" exhibition (we thank thee, June, for teaching us that word) at the Institute of Painters in Water Colours is sure to be an attractive one; for, to clever, striking examples of Messrs. Absolon's, Corbould's, Warren's, and the better known of the members' skill, there are some choice and very finished performances contributed by the younger of the figure draughtsmen, in addition to a capital display of landscapes, to give it more than ordinary interest. Mr. Andrew C. Gow's drawings are especially noticeable for the precise and elaborate finish which he manages to attain without sacrifice of breadth in effect or purity of colour, and with very truthful imitation of light. "An Armourer" (66) and "Hamilton of Bothwellhaugh" (83) are examples that prove the value of these qualities when invested in the mere positive representation of two well-costumed and appointed figures; but where motive or narrative may be concerned, Mr. Gow has shown himself the taming influence of making these technical excellences a chief consideration in his depiction of a belligerent Roundhead drawing on some Cavaliers (360), for there is a want of character and force in this,—

> "A controversy that affords
> Actions for arguments, not words."—*Hudibras.*

Mr. James D. Linton's studies are very exqui-

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site, none more so than that of a lady designated "Maud" (324), which is but one of some eight or nine that betoken a rare combination of power and refinement. Mr. Valentine W. Bromley delights in picturesque allusions to the past. "The Terrace" (52); "A Lily" (387); "The Lady's Maid" (393), and "A Steel Mirror" (423), are dainty little pictures that apostrophise life 400 years ago at least, and speak of more enduring fashions than those that regulate our dress. How old the world is, and how young are some of its oldest customs.

Mr. Chas. Cattermole, in his several small compositions, exhibits a similar fancy for indicating the long wear of human habits; and this fancy helps him to paint in very bright colours very ordinary incidents: he is always seen to the best advantage on the scale of such works as "My Lady's Pensioners" (416), or, again, in "The Chapel" (425), where the sins that may not be covered by charity are being confessed. "May Day" with my lord and my lady, and the clown, who, in connexion with Jack-in-the-Green, was never known to do anything else [illegible] y "Hollo! boys" (53), is a record of an obsolete institution, that shares some of the interest attached to fifteenth or sixteenth century incidents; but it is in artfully, if not artificially, disposed heroines of the present era that Mr. C. Green's clear, dexterous manipulation tells to the best effect. "The Sketcher" (403) and another charming young lady, who appears to be making a very elaborate study of something or somebody, "In the Wood" (412), are two of the choice items in the collection. "Juliet's Nurse" (75); and "A Royalist" (349), are two very clever studies, by Mr. H. B. Roberts; and with Mr. R. Beavis's Borderers on "The March—Stormy Weather," driving the cattle before them secured in their last raid (31); Mr. Guido Bach's "Bohemian Mendicants" (97), and various other studies, including more of Bohemians, very easily and largely done, Mr. A. Bouvier's "Wallachian Girl" (101), and Mr. E. H. Corbould's autographic ink sketch illustrating a black-letter edition of a nursery rhyme, that speaks of the dogs that barked in their antipathy to beggars (123), are of those things that, when found, will be made a note of.

Mr. H. Tidey's two children, "Daisy" (213) and "Dolly" (233), will meet with more admirers by reason of their agreeable naturalness than would many a more pretentious work, with less claim to be considered truthful.

What bright, fresh-looking little children Miss Emily Farmer selects for her study: the little dot who is drawing tones from a concertina, and making "Music" (90) visible, and she who is "Saying Grace" (364) before a feast-of-reason dinner, are music and reason most gracefully and cleverly portrayed,—types of such mundane enjoyment as Mr. G. G. Kilburne's "Puritan Preacher" (19), in a dry hard manner would be most likely to deprecate; but Miss Farmer's reflections are more pleasurable than the solid, stolid representation of the preacher, excellent as it is in its way.

But the landscapes, studies on shore and of sea,—buildings, exteriors and interiors, call for an equal share of attention. It must be delightful, indeed, to such an adept in the art of transcription as Mr. Wm. Bennett, to fix Nature, as it were, in his questions of her; to learn her answers, and to put them down in such a quick handwriting,—short-hand, perhaps, but everybody can read it. Who can talk so lightly of old corrugated trunks, fresh young leaves, and the dewy grass that grows on the earth,—the grave of the young and aged alike,—without thinking more than he says? No one can speak more in a few words than Mr. Bennett, or, in a rough way, more feelingly. "Sketch of Royal Oaks, Windsor Forest—Autumn" (79). Mr. Edmund Warren honestly announces his more direct communing; he relates the "Whispers of Winter" (100) in a beechen grove, with falling leaves to punctuate the minutes of his meeting: rather a dark picture, but an honest one,—for, Time will come, and Time will go, and we can't go on for ever.

Messrs. H. G. Hine, J. G. Philp, J. Mogford, H. Maplestone, J. W. Whymper, W. L. Leitch, J. C. Reed, and Messrs. Pidgeon, S. Prout, Rowbotham, Telbin, Hargitt, Harry Johnson, Mitchell, A. Penley, Richardson, and Wood, are all admirably represented; and Mr. Carl Werner and Mr. C. Vacher retain their riches as wise men of the East,—and clever men anywhere.

Mr. James Fahey, amongst some eight or ten examples, exhibits a very masterly drawing, "Blackgang Chine, Isle of Wight" (281); Mr. Shalders is as clever as ever in his studies of sheep; and Mr. D. H. M'Kewan quite monopolises a right here of painting "gallery pictures;" a right that is not to be waived any more than Mr. Edwin Hayes's as a wave-painter; sea—sea in many instances. Mr. Mole is as indicative of peace and rural felicity as ever: industry and content are the lessons he teaches, and they are good ones,—nicely and quietly taught, but, apparently, never conclusive.

Messrs. W. W. Deane & J. H. D'Egville paint Venice in her own colours, seen with artists' eyes; and their drawings very much add to the value of the collection.

CO-OPERATIVE STORES, EDENFIELD, BURY.

THE new hall in connexion with Edenfield Co-operative Society has been opened.

Early last year, the committee having decided to build new stores and six houses, a plot of land was secured for the purpose near the toll-bar, on the Bury-road. Plans were procured from Messrs. Maxwell & Tuke, and the building was begun in May, the work being let separately to local tradesmen for the sum of 2,463*l.*, exclusive of heating apparatus and fittings, and this sum has only been exceeded by about 10*l.*, which must be a source of gratification to the committee. The total cost, including fittings, is 2,800*l.*, which sum, however, does not include the cost of land. The design of the building is extremely simple. The fronts are of pitch-faced parpoints, with Holcombe stone dressings. Towards the front are three shops; the grocer's 22 ft. by 31 ft., at the end of which are shoots and bins for flour, &c., which are tipped from the warehouse behind upon a higher level. The draper's shop is 26 ft. by 24 ft.; the butcher's, 18 ft. by 16 ft.; and the clogger's shop, which is in the side street, is 20 ft. by 12 ft. There are also in this street the cart-entrance to the warehouse, a room 43 ft. by 21 ft., and the entrance to the assembly-room on the first floor, which is a room 65 ft. by 31 ft., with plain hopper ceiling and plaster moulds. Attached are secretary's room, board-room, ante-rooms, tea-room, &c., the whole being heated upon the super-heated principle as applied by Mr. Longbottom, of Pleasington.

ON EARTHQUAKES.

EARTHQUAKES are movements of the superficial crust of the earth, consisting for the most part of one or more rapidly succeeding undulations, accompanied often by sounds, and traceable distinctly in some particular direction, chiefly linear, taking time to proceed from one point to another. The shocks of earthquakes are of three kinds:—

1. The *undulatory* motion, which takes place horizontally, heaving the ground upwards and downwards.

2. The *successive* motion, in which the ground is heaved up in a direction more or less approaching to the perpendicular.

3. The *vorticose*, or twisting motion, which is a combination of the two preceding ones, several undulations taking place contemporaneously, and this interfering with the other, producing a complexity of rotatory movement, like the surface of the sea. Of these three kinds the first are the most common and the most harmless. From the second more is to be apprehended; but the *vorticose* movement is the one which has been felt in the most violent and disastrous catastrophes on record. (Daubeny on "Volcanoes," p. 509.)

Generally after the shock of the earthquake the great ocean wave reaches the shore, and completes the destruction. The sound of the explosion is conveyed through the earth at the rate of from 7,000 ft. to 10,000 ft. in a second in hard rock. When an earthquake begins under the ocean it occasions five distinct series of waves or undulations. But sounds sometimes occur when there is no earthquake. The oceanic wave raised at Lisbon travelled to Barbadoes at the rate of seven to eight miles, and to Portsmouth at the rate of little more than two miles, in a minute. The velocity of the shock varies with the elasticity of the strata it passes through. In the great earthquake in Calabria in 1783, most damage was done at the junction of the deep alluvial plains with the hard strata of the mountains. The earthquake that happened in 1842 in Guadaloupe was felt over an extent of 3,000 miles. A shock is sometimes perceived in a mine that is not felt at the surface, though in some instances miners have not been sensible of the shocks felt on the surface above. The raising and depressing of land almost imperceptibly is always going on. The coast of Denmark on the Sound, the island of Saltholm, opposite to Copenhagen, and that of Bornholm, are rising; the latter at the rate of 1 ft. in a century. The coast of Memel, on the Baltic, has actually risen 1 ft. 4 in. within the last thirty years, while the coast of Pillau has sunk down 1½ in. in the same period.

The most extensive district of earthquakes comprises the Mediterranean and the adjacent countries, Asia Minor, the Caspian Sea, Caucasus, and the Persian mountains. The chief focus of the vast volcanic district in central Asia appears to be Thian-Shan, including Lake Baikal. Africa is almost entirely free from them, and they are extremely rare in the great eastern plains of South America. 318 earthquakes are recorded to have occurred in the valley of the Danube since the commencement of the fourth century.

The smallest number of earthquakes occur in Russia, and in the Ural Mountains they are almost unknown. The whole chain of the Andes, especially the Cordilleras, are exposed to every kind of subterranean disturbance felt along a line of 1,000 miles.

In argillaceous strata, it frequently happens that the fissures caused by earthquakes close up again; but in more solid rocks they remain open for ages.

Mr. Mallet gives us the following order of the phenomena of an earthquake:—"First we have the earth sound-wave, and the great earth-wave or shock; the sound wave through the air; the sea-wave occurring at the time, called the forced sea-wave, and the great sea-wave, all originating at the same moment, and produced by one impulse. The sound-wave through the earth, and the great earth-wave, or shock, arrive first, and are heard and felt on land, accompanied, as far as the beach, by the small sea-wave called the forced sea-wave; these are almost instantly succeeded by the sound-wave through the sea; next arrive the aërial waves of sound, and these continue to be heard for a longer or a shorter time; and finally, the great sea-wave rolls in upon the shore. The velocity of the land-wave, and that of the accompanying sea-wave being ascertained, it would seem possible to determine the distance (out at sea) from the spot affected at which the earthquake originated. But the former will vary with the nature of the rock through which it is transmitted; for the harder and more elastic the rock is, the greater will be the velocity of the earth-wave produced, and *vice versâ*." The velocity of the earth-wave through limestone is about 40 miles per minute; sandstone, 57 miles per minute; marble, 73 miles per minute; or through clay slate, 140 miles per minute.

In the "Histoire des Progrès de la Géologie" (vol. i.) some statistics are given regarding 3,432 distinct earthquakes that have occurred in Europe and the adjacent parts of Asia and Africa, between the commencement of the fourth century and the year 1844 inclusive. Of these the dates of nearly 3,000 are known, and they have been found to be thus distributed in the different months of the year:—

December	300	911 in winter.
January	366	
February	275	
March	265	710 in spring.
April	235	
May	210	
June	210	653 in summer.
July	216	
August	236	
September	221	705 in autumn.
October	252	
November	232	

There have thus been 1,712 recorded eruptions between the 1st of October and the 31st of March, and only 1,335 from the 1st of April to September 30th. This general result is remarkable as being in conformity with the more detailed observations, and also because it appears that in each particular year the same order was observed; but it must not be regarded as important with respect to the general phenomena of earthquakes in other districts where other results may be obtained. In Upper and Western India, between 1800 and 1842, 162 earthquakes are recorded.

Mrs. Somerville (*Physical Geog.*, p. 161) states that 255 slight shocks have occurred in Great Britain, of which 139 took place in Scotland; the most violent of these have been felt at Comrie, in Perthshire, in 1839. Of the rest, 14 took place on the borders of Yorkshire and

Devon, 30 in Wales, and 31 on the south coast of England. They were all preceded by a sudden fall of the barometer, and unusual sultriness. Those who have felt an earthquake describe a feeling of dread or horror produced upon them. The lower animals especially feel this. Humboldt says the noise often heard is "rolling, rattling, clanking like chains, occasionally like thunder close at hand: or it is clear and ringing, as if masses of obsidian or other vitrified matters were struck in caverns underground." Noises have been heard at 700 miles' distance from the place where the earthquake took place. An earthquake has damaged the Great Pyramid of Egypt, though that country has been very free of these convulsions for a long time. Sir Charles Lyell says "the energy of subterranean movements has always been uniform as regards the *whole* earth,"—a comforting assurance.

The first earthquake on record occurred B.C. 1491, when the law was delivered to Moses on Mount Sinai (Exodus xix. 18). Forty-one years after that one took place in Central Italy, which swallowed up a city and produced Lake Ciminus in its place. China was visited by an earthquake B.C. 595. In 425, a very severe one occurred in Greece. B.C. 224, the Colossus at Rhodes, one of the "Seven Wonders of the World," was overthrown by an earthquake. B.C. 33, more than 30,000 people perished from this cause in Palestine. Antioch was destroyed A.D. 115, and in the same year an earthquake was felt in China. In 262 an earthquake devastated Rome, Libya, and Asia Minor, attended by an eclipse. About 555, an earthquake was felt at Constantinople, and in the same place two years afterwards. In 684, more than 500,000 acres of land in the Japanese island Sikokf were swallowed up by the sea. In 859 another earthquake occurred at Antioch, when 1,500 houses were destroyed. Wendover tells us that in 974 a great earthquake shook all England. A correspondent of the *Spectator* says that in 1081 one occurred in this country which was attended "with heavy bellowing." In 1089, there was "a mickle earth-stirring all over England," according to the *Chronicle*. Florence, of Worcester, says that in 1110 "there was a very great earthquake at Shrewsbury. The river Trent was dried up at Nottingham from morning to the third hour of the day, so that men walked dry shod through its channels." Matthew Paris says that in 1165, "there was an earthquake in Ely, Norfolk, and Suffolk, so that it threw down men who were standing and rang the church bells." He speaks of others in 1187 and 1247. In the latter, the sea became preternaturally calm for three months. In 1248 another was felt in the West of England. Holinshed says that in 1185 "a sore earthquake chanced through all the parts of this land, such a one as the like had not been heard of in England since the beginning of the world; for stones that lay couched fast in the earth were removed out of their places, houses were overthrown, and the great church of Lincoln rent from the top downwards." In 1247 one occurred on St. Valentine's Eve, and did considerable damage in London. It is stated that three months prior to the shock the sea ceased to ebb and flow on the English coast. On September 12, 1275, Glastonbury Church was destroyed in this manner, and in 1361 John Harding records in his metrical chronicle:—

"On St. Mary's Day,
The great wind and earthquake marvellous,
That greatly gave the people all affraye,
So dreadful was it and perilous."

In 1381 Fabyan says an earthquake occurred, "the like thereof was never seen in England before that day nor since." And the next year Harding writes:—

"The earthquake was, that time I saw
That castles, walls, towers, and steeples fyll,
Houses and trees, and crags from the hill."

This happened on the 21st of May, and was followed three days after by a "watershake," by which the ships in the harbours were driven against each other with great violence. ("Book of Days," i., 232.)

In 1456 a terrible earthquake devastated the country round Naples, many towns were injured, and 60,000 lives lost.

On May 21, 1382, Stowe says "there was a great earthquake in England at nine of the clocke, fearing the hearts of many; but in Kent it was most vehement, where it sunk some churches and threw them down to the earth." A song written at the time is contained in "Political Poems and Songs relating to English History," i., 1859. The spelling is modernised:—

"And also when this earth-quake,
Was none so proud he was aghast,
And all his jollity forsook,
And thought on God while that it last;
And as soon as it was over-past,
Then wax as evil as they dead are;
Each man in his heart may cast,
This was a warning to beware.

Forsooth, this was a Lord to dread,
So suddenly made men aghast,
Of gold and silver the took nane heed,
But out of their houses full soon they passed;
Chambers, chimneys, all to burst,
Churches and castles foul 'gan fare;
Pinnacles, steeples, to ground it cast,
And all for warning to beware."

In 1531 Spain was visited, and Lisbon suffered much. In that city 1,500 houses were thrown down and many buildings destroyed. Of the great earthquake 200 years later we shall speak hereafter.

Burton, in his "History of Earthquakes," tells us that in 1571, on the evening of February 17, the earth near Kinaston, Herefordshire, began to open, and a hill called Marclay Hill, with a rock under it, made at first a mighty bellowing noise, off, and then lifting itself up began to travel, carrying along with it the trees that grew upon it, the sheepfolds and flocks of sheep abiding thereon at the same time. In the place from whence it removed it left a gaping distance 40 ft. wide, and 80 ells long. The whole field was nearly 20 acres. Passing along it overthrew a chapel, and removed a yew-tree which was growing in the churchyard from the west to the east. Another earthquake was felt in Yorkshire, Worcestershire, and several of the adjacent counties in May in the same year.

In 1580 (April 6th) a severe earthquake was felt in London. People rushed out of the theatres, part of the Temple Church was thrown down, and two apprentices were killed at Christ Church by a fall of a stone during the service. Much damage was done in Kent by this earthquake. Queen Elizabeth caused a form of prayer to be used by all householders. In 1638 (March 28th), 180 towns and villages of Calabria and Sicily were reduced to ruins. In 1680, Lyme Regis suffered by an earthquake. An earthquake was severely felt in London and other places September 8th, 1692. Evelyn says, "At Mins it has made some demolition. I happened to be at my brother's house at Wotton (Surrey), when the shaking was, and at dinner with much company, yet none of us at table were sensible of any motion. But the maid who was making my bed, and another servant in a garret above her, felt it plainly, and so did my wife's laundry-maid here at Deptford. In London, and particularly in Dover-street, they were greatly affrighted." In the next year the great Sicilian earthquake destroyed 100,000 persons. In 1747 a great earthquake destroyed Callao, and there is an absurd statement that only one of the inhabitants was saved; but Sir Charles Lyell has shown that 200 escaped.

On the 8th of February, 1750, an earthquake was felt in London. Several chimneys were thrown down, and walls rent. A shepherd at Kensington heard the noise rush past him, and instantly saw the ground wave under him like the face of the river; the tall trees of the avenue where he was nodded their tops very sensibly, and quivered. (Philos. Trans., xlvi.) Walcott, in his "Westminster," says that during this earthquake, felt between twelve and one o'clock, the Thames was greatly agitated, and the barristers were greatly alarmed, for they thought that Westminster Hall was coming down. Another earthquake was felt March 8th in the same year. The houses near the Thames were most shaken. It is stated (Philos. Trans., xlvi.) that near London there was a continued and confused lightning till within a minute or two of the shock; dogs howled, fish jumped 3 ft. out of the water, a ball of fire was also seen. Martin Folkes, P.R.S., stated that he did not on this occasion perceive that lifting motion which he was sensible of on February 8th, but he felt very quick shakes or tremours horizontally. A boatman on the Thames felt his boat receive a blow at the bottom, and the whole river seemed agitated. In the Temple Gardens, the noise was greater than the loudest report of cannon. It resembled distant thunder in the air, but was not a subterranean explosion. A vast ball of fire was observed, and frequent flashes of lightning. The shock lasted a minute. Walcott says great stones were thrown from "the new spire" of Westminster Abbey, and in several steeples the bells were struck by chime-hammers. Horace Walpole, writing to Sir Horace Mann, says, "I had been awake, and had scarce dozed again when on a sudden I felt my bolster lift up my head; I thought somebody was getting under my bed, but soon found it was a strong earthquake, that lasted near half a minute, with a violent vibration and great roaring. I rang my bell, my servant came up frightened out of his senses; in an instant we heard all the windows in the neighbourhood flung up. I got up, and found people running into the streets, but saw no mischief done; there had been some,—two old houses flung down, several chimneys, and much china ware. Admiral Knowles, who had lived a long time in Jamaica, and felt seven there, says this was more violent than any of them. It has nowhere reached above ten miles from London. A parson, who came into White's the morning of earthquake the first, and heard bets laid as to whether it was an earthquake or the blowing up of powder-mills, went away exceedingly scandalised, and said, 'I protest they are such an impious set of people that I believe if the last trumpet were to sound they would bet puppet-show against Judgment.'"

Another was felt on the 18th of March, in the same year, at Portsmouth, Southampton, and the Isle of Wight. In the next month Cheshire, Flintshire, and Yorkshire were startled in a like manner, and in May one was felt in Dorsetshire, and another in Somersetshire in July, Lincolnshire in August, and yet another on September 30th in Suffolk, Leicester, and Northampton.

The great earthquake of Lisbon happened on November 1st, 1755. A work published in 1757 gives the following account of this terrible disaster:—

"The year 1755 proved very wet and rainy, the summer cooler than usual, and for forty days before the great earthquake clear weather, yet not remarkably so. The 31st of October the atmosphere and light of the sun had the appearance of clouds, with a notable obfuscation. The 1st of November, early in the morning, a thick fog arose, which was soon dissipated by the heat of the sun, no wind stirring, the sea calm, and the weather as warm as in England in June or July. At thirty-five minutes after nine o'clock, without the least warning, except a rumbling noise, not unlike the artificial thunder at our theatres, a most dreadful earthquake shook, by short but quick vibration, the foundation of all Lisbon, so that many of the tallest edifices fell that instant."

We may remark that the people were in the churches, for it was the festival of All Saints, and a multitude perished when the great church of St. Paul fell. The account continues, "Then, with a scarcely perceptible pause, the nature of the motion changed, and every building was tossed like a wagon driven violently over rough stones, which laid in ruins almost every house, church, convent, and public building, with an incredible slaughter of the people. It continued in all about six minutes. At the moment of the beginning some persons on the river, near a mile from the city, heard their boat make a noise as if run aground or landing, though in deep water, and saw at the same time the houses falling on both sides the river. The large new quay, called Cays Depreda, was overturned, with many hundreds of people on it, and sunk to an unfathomable depth in the water, not so much as one body afterwards appearing. The bar was seen dry from shore to shore; then suddenly the sea, like a mountain, came rolling in, and about Belem Castle the water rose 50 ft. almost in an instant, and had it not been for the great bay opposite to the city, which received and spread the great flux, the low part of it must have been under water. As it was, it came up to the houses, and drove the inhabitants to the hills. About noon, there was another shock, when the walls of several houses which were still standing were seen to open from top to bottom more than a quarter of a yard, but closed again so exactly as to leave scarce any mark of the injury. 60,000 people were buried, crushed, or drowned. At Colares, a distance of about twenty miles from Lisbon, three distinct shocks were felt, accompanied by the emission of a quantity of smoke, and the fountains were affected. At Coimbra, several buildings were destroyed, and at Oporto the shocks were felt for six or seven minutes, during which everything shook and rattled. At or near Cadiz, the destruction was great, and a terrific wave came 60 ft. in height. It was felt at Gibraltar and Madrid; at the latter place, the indications were very decided. At Seville, the cathedral was damaged. The seaport of Setubal, twenty miles from Lisbon, was engulfed, and disappeared altogether. Near Morocco the earth

opened and swallowed up a town with 8,000 inhabitants. This earthquake was felt in France, near Angoulême. A subterranean noise was heard, after which the earth opened and discharged a torrent of water, mixed with red sand. In Italy, shocks were felt at Turin and Milan; and the waters of the Mediterranean were greatly disturbed. Agitations were noticed on the lakes of Geneva and Zurich, in Switzerland. Movements were felt in Germany, Holland, Norway, and Bohemia; also in the British Islands, particularly in Derbyshire and Berkshire, and movements of the water were observed along the coast. Mr. Mallet states that it was also felt at Loch Lomond, in Scotland:—'The water, without any apparent cause, rose against the banks of the Loch, and then subsided below its usual level: the greatest height of the swell being 2 ft. 4 in.' The time of the shocks in England was from 9 30 to 11. Parts of Africa were affected, especially on the Mediterranean coast. These various places we have mentioned are so far distant that the effects of the earthquake of November 1, 1755, were distributed over very nearly 4,000,000 of English square miles of the earth's surface." (Hist. and Philos. of Earthquakes, p. 333.)

On February 8, 1761, a shock was felt along the banks of the Thames, from Greenwich to Richmond. Chimneys were thrown down at Limehouse and Poplar. It was felt also at Hampstead and Highgate. Another shock, more violent, took place on the same day between five and six, the air being very warm, and strong lightning flashed for some time before. Persons fled to the streets, thinking their houses were coming down. In St. James's Park and other open spaces at the West-end the tremulous vibration was most distinct, and seemed to move in a south and north direction.

On June 7, 1773, the city of Santiago, in Guatemala was destroyed; 6,000 families perished. On February 5, 1783, the Calabrian earthquake took place. The ground for miles appeared like the sea. Immense ravines were formed: one measured a mile in length, 105 ft. in breadth, and 30 ft. in depth. Another was three-quarters of a mile long, 150 ft. broad, and more than 100 ft. deep. (Lyell's "Principles," p. 459.) In this earthquake 40,000 persons perished. Dolomien, who saw the city of Polistena, in Calabria, after the earthquake, says:—"The scene of horror almost deprived me of my faculties; my mind was filled with mingled horror and compassion. Nothing had escaped; all was levelled with the dust; not a single house or piece of wall remained; on all sides were heaps of stone so destitute of form that they afforded no idea of there ever having been a town on this spot." The Prince of Scilla and 1,430 of his servants perished.

In 1805 (July 26th), another severe earthquake devastated Calabria,—20,000 persons perished. In 1816, on the evening of the 13th of August, a shock was felt over nearly the whole of the north of Scotland. The shock lasted only six seconds, and travelled from S.S.E. to N.N.W. Heavy articles of furniture were removed, bells set ringing, &c. At Inverness the walls of many houses were rent from top to bottom.

In July, 1843, shocks were felt on the Cornish coast; and on the 22nd of December, in the same year, considerable shocks occurred in Brittany. In January, 1845, an earthquake was felt at Arendal, in Norway.

Three years before, a report was circulated that London would be destroyed by an earthquake on St. Patrick's Day (March 17th). It was founded on certain doggerel prophecies pretended to be pronounced in the year 1203, and preserved in the Harleian Collection. Numbers of persons left the metropolis. But, upon reference to the British Museum, the so-called prophecies were not to be found, and it was evidently an attempt to impose upon public credulity.

Several earthquakes occurred in 1851. One of these, on August 14th, destroyed the towns of Melfi and Barile, in South Italy, with 1,000 people.

On November 9th, 1852, slight shocks were felt in the north-western counties.

In 1857 (December 16th), Calabria was again visited by a most destructive earthquake, and 10,000 persons perished.

On October 6, 1863, a shock was slightly felt in London, but more in the centre and western parts of England.

On the 18th of November, 1867, the island of St. Thomas, which, twenty days previously, was the scene of a terrific hurricane, was visited by an earthquake. In this case also a great wave, 40 ft. or 50 ft. high, came towards the harbour at the rate of fifty miles an hour. It was, however, happily broken by the rocky headlands, and did not go inland more than 100 yards above the usual high-water mark. The disaster extended to other adjacent islands.

The coast of Peru on the 13th of August, 1868, was visited by a terrible earthquake, accompanied by a wave which destroyed a vast quantity of property and many lives. At Caldera no shock was felt,—the town stands some height above the sea,—but at Copiapo, about fifty miles distant, some houses were seriously shaken. At Iquique, a few minutes past five in the afternoon, there was a low rumbling sound. The natives knew what was coming, and fled from the houses, and very few lives were lost by the earthquake; but the sea receded with great rapidity for a considerable distance, and met a vast wave 40 ft. high rolling steadily on at the rate of about fourteen miles an hour. It surged over the town and neighbouring beach; everything in the lower parts of the town was swept away. Most of the people had fled to the higher parts of the town, and so escaped, but more than 150 were swept off. The loss of property is estimated at 500,000*l*. Twenty miles north is the port of Mexillones. Here the sea receded, and came back in the same manner, and thirty people were drowned, and a great deal of property was destroyed.

At Arica (population 4,000), a town containing some of the handsomest and most substantial of any buildings in Peru, the sea had a dull appearance, and the gulls were said to quit the bay with loud screams. At 4.45 p.m., the first shock of the earthquake was felt. Mr. Nugent, the vice-consul, says:—

"When I felt the first shock, I went to the room where Mrs. Nugent was to tell her not to be alarmed, but as I got there, a second one came, so violent, that I carried off the children, and we all rushed out of the house. Scarcely had we reached the street, when it all came down, everything around us was tumbling down, and my wife said, 'Let us go and stand on the ruins of our house,—nothing can touch us there.' I had, however, long made up my mind that if ever we had a severe earthquake, the sea would come in, and I said, 'Let us make for the high ground.' We passed up the centre of the street; everything in ruins, numbers of dead, and the wounded lying under the walls, shrieking for assistance. Blinded with dust, and scarcely able to breathe from the sulphur in the air, we stopped at the first rising ground. The whole town, with the exception of a few of the second-storied houses, was shaken down. They stood high above the ruins. The quay and mole were crowded with people, who appeared to be panic-struck, for the sea had gone out from the bay, and there was a great wave coming in; presently they took flight, but at least 200 of them were swept away. Wave succeeded wave, at intervals of about a quarter of an hour, and long before dark there was not a vestige of the lower part of the town remaining. During all the night the shocks of earthquake continued, and the noise was like distant cannonading. The water in the few wells that could be got at was so hot (sulphuric), that it was quite undrinkable. So we passed the night on the hills."

The waves carried off the engines on the railway, and destroyed the Custom-house and its contents. The six vessels at anchor in the bay were all lost. Besides these, the *Wateree*, United States gunboat, battened down, and took every precaution that seamanship could suggest against the approaching danger. But she was whirled about by each wave, till one larger than the other carried her off and left her among the sand-hills far from the beach. She was landed perfectly upright without a scratch, and not a man was lost. The American Admiral determined to offer her for sale, as the expense of getting her 400 yards over the country, and launching her, would be very great.

Many slight shocks have since been felt along on the coast of Peru. The effects of this earthquake have been felt along the whole coast, from 8 deg. to 42 deg. south latitude. Juan Fernandez was visited by the great wave. We are indebted for these facts to the report communicated to the Board of Admiralty. A despatch from her Majesty's Chargé d'Affaires at Lima states that the earth continued in movement for a whole month, to the 13th of September. People hoped that there would be no more shocks, and they were warranted in this hope by former experience; for, according to the chronicles of the unfortunate city which has now been in ruins three times, formerly by the "terremeto" of St. Ursula, in the seventeenth century, and then in the year 1784 the earth kept in motion for thirty days. The rebuilding of Arequipa will probably be the work of a century, and the cost 40,000,000 dollars; the loss of 6,000 houses and 200 farms and factories may be computed at a higher sum. The despatch goes on to state that, contrary to expectation, several shocks had been felt since the 13th of September. 7,000 or 8,000 people left Arequipa for the interior. At Arica the French hotel was displaced bodily by the waves, and ultimately left on the ruins of another house.

Mr. E. G. Squier (an archæologist) says there is nothing incredible in the story told by General Kilpatrick, United States Minister to Peru, that during the recent earthquake at Arica, 500 mummies were thrown on the surface. He says:—"The desert hills behind Arica, as indeed those surrounding the few habitable spots on the Peruvian coast, are literally stuffed with the desiccated bodies of the aborigines. They are but thinly covered with the light and nitrous sands, and are often exposed by the winds. I have seen dozens of them at Arica, lying on the surface, wrapped in coarse grass matting, or in their crumbling nets, for most who lived here seem to have been fishermen. I have carefully examined hundreds of the so-called mummies without finding the slightest evidence that their preservation is due to other than natural conditions of soil and climate."

On the 26th of March, 1868, a slight earthquake was felt in various parts of Wales, and on October 30th, at 10.40 p.m., a distinct shock was felt in the West of England and in South Wales. Some of the correspondents of the *Times* describe it as a trembling of the earth as if a laden wagon was passing along the street. Up to the time of the shock the weather was cold, but the thermometer rose 15 degrees on the Saturday. Three shocks were felt in Leamington. Dr. O'Callaghan noticed them, and he had, on more than one occasion, felt the shocks of earthquakes in the West Indies. Dr. Burder, of Clifton, said:—"My own impression was that of a heavy blow from beneath, the impulse of which was communicated upwards, through the chair on which I sat. I was not conscious of any lateral movement, nor of anything that could be called vibration." Mr. Parminter, of Swansea, said his "experience of it was a trembling of the house, with a rumbling noise for about five seconds, and then a very perceptible swaying to and fro of the room myself and family were sitting in." Mr. Ward-Jackson, of Great Malvern, said "it began with the usual rumbling and vibratory sort of sound, followed immediately by three distinct vibrations, proceeding as nearly as I could judge in a direction from N.W. to S.E., lasting about nine or ten seconds. The night was fine, calm, and mild."

Another gentleman stated that his "bed felt as if it were lifted up with a tremulous motion." The shock was felt at Liverpool and Manchester.

Another correspondent of the same paper said, "My chair for an instant shook violently, and I perceived what I might have taken for a furious blast of wind, but it was too instantaneous, and it seemed to come from the earth rather than from the air. The shock was not violent, nor did it seem to last so long, as that which affected a considerable area in the south of England early in the morning of October 6th, 1863. On that occasion, I was awakened from my sleep with the impression that a stack of chimneys on one side of my room had fallen down, and that I should see the wall opposite to my bed crack open."

In Leicester, the window frames rattled, and also various things in the houses, so violently as to disturb the inhabitants from their slumbers. At Blackheath, near London, a correspondent of the same paper states, "My daughters came down from their beds in the greatest alarm, and said they had had their beds shaken under them, and that they were convinced it was an earthquake. A servant in the house, who was also in bed, stated that she had felt the same shaking, and each of them from the sensation experienced a feeling of sickness."

Nor was this all. Another shock was felt at Holyhead at five minutes to four on Tuesday morning, November 3rd, 1868. *The Birmingham Post* stated that several persons living in the vicinity of Raglan-street, Coventry, said that on Tuesday night they felt the shock of an earthquake. Slight shocks have also been felt this year.

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There is a very able paper in *Blackwood's Magazine*, July, 1869, on the electric theory of earthquakes and volcanoes. The writer explodes the absurd theory that at twenty miles below the surface the central heat is so great that the hardest granite is in a state of fusion, and that our planet consists of a molten mass nearly 8,000 miles in diameter, covered by a semi-molten crust only twenty miles in thickness, and of which crust only two miles have a temperature under the boiling point. The mean density of our planet is nearly five and a half times that of water, whereas the average density of the strata which we know is less than three times that of water, so that the central fire theory cannot be right. This latter theory is founded on the statement that in some mines and artesian wells the temperature gradually increases. But in one deep mine in Cornwall, at a certain point, the temperature begins to decline. Now, the theory advanced by the writer is this, that there is a zone of electric action in the crust of the earth corresponding with—but superior in intensity to—that which every one sees to exist in the surrounding gaseous envelope of the atmosphere. The electric currents ceaselessly passing to and fro in the subjacent rocks will necessarily develop heat, and in some kinds of rock, more than others. In metal mines the shaft is sunk through metalliferous strata, or through those kinds of rocks most permeated by electric currents. The increase of subterranean temperature is probably restricted to a narrow zone immediately underlying the surface, with a cold, dense stratum of rock underneath. Earthquakes may be, then, described as thunder-storms in the earth. When the electric action in the crust of the earth is developed to an excessive degree, and the conductive power of the rocks becomes inadequate to pass the currents with sufficient rapidity, an earthquake takes place. In severe shocks these vibrations swell into waves of commotion, extending long distances. The cyclones or rotatory storms in the atmosphere are due to electricity, and the earthquake which takes this form is always the most destructive, and clearly of electric origin. According to this theory, volcanoes are vents, which the subterranean electric action makes for itself, being eruptive; while earthquakes are vibratory. In the latter case, the subterranean explosive force cannot make its way to the surface, but produces terrible vibrations.

In the tropical regions, the zone of electric action is most active, and hence earthquakes and volcanoes occur there most frequently. We cannot go further into the facts given in the paper to support this opinion; but we think the theory that earthquakes and volcanoes are attributable to disturbances in the outer rim of the earth's crust occasioned by electric action analogous to those which have their seat in the atmosphere, is well worthy of attention. JOHN PIGGOTT, JUN.

KENSINGTON NEW PARISH CHURCH.

Of the ancient parish church of Kensington (written "Chenesiton" in Domesday-book, and "Chensnetuna" in other ancient records) nothing is known. Faulkner, in his "History and Antiquities of Kensington," says:—"This church was probably dedicated to St. Mary, and when it was annexed in the year 1111 to the Abbey of Abingdon, it received the additional epithet of Abbots, and is now called St. Mary Abbots' Kensington." The first vicar of Kensington, named in Newcourt's "Repertorium," is Roger de Besthorp vel Westhorp, A.D. 1260.

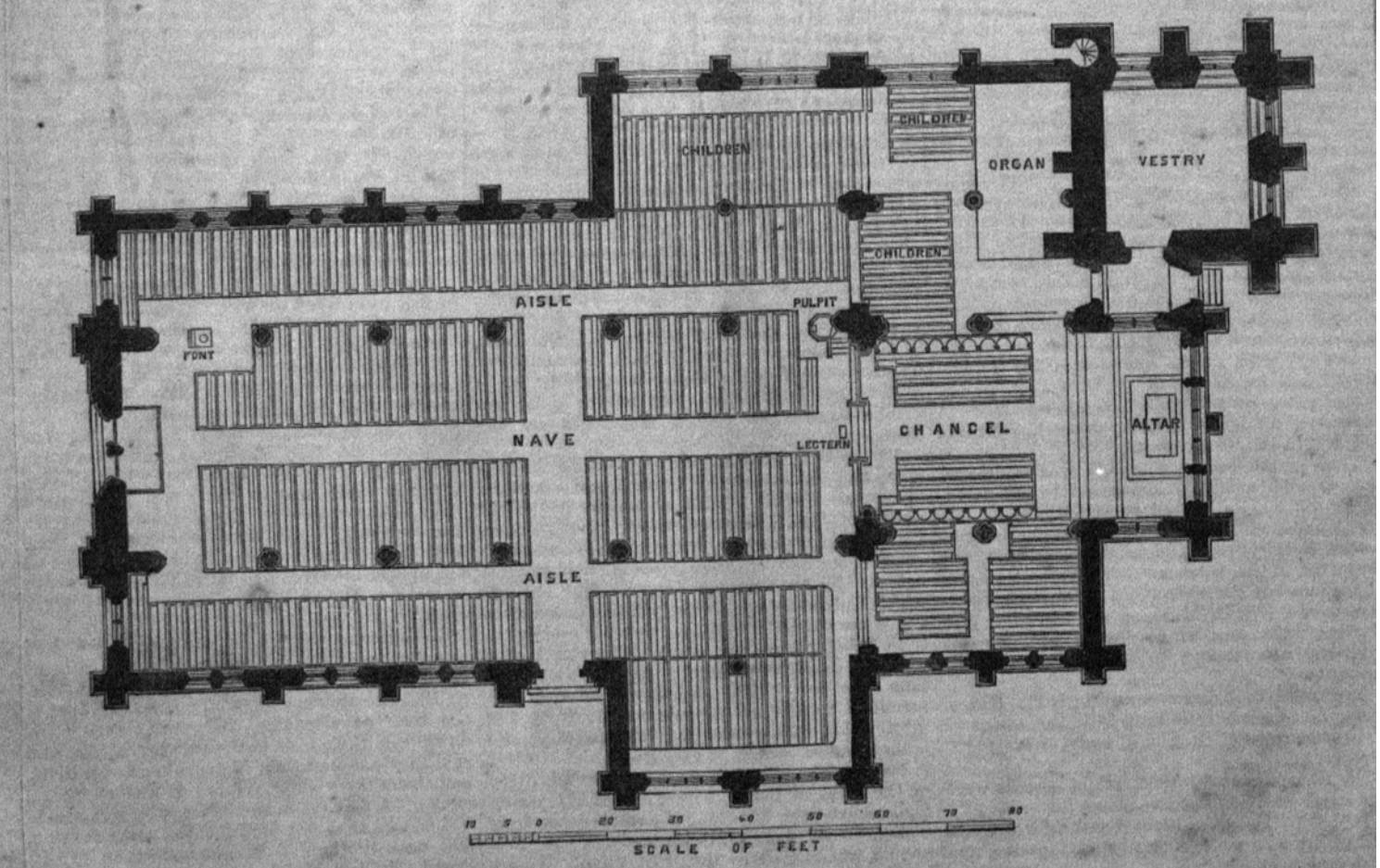
It appears that in 1683 the inhabitants, finding their church too small for the increasing population, built a new aisle on the south side; and then, in 1695, determined on pulling down the north aisle and chancel, and building others of larger dimensions. In 1696, however, a resolution was come to to pull down the whole church, with the exception of the Gothic tower. This was done, and a new structure erected, but with so little skill apparently, that, by the year 1704, the wall having cracked, and the timbers being found too weak, a large part of the church was taken down to the ground and rebuilt. In 1772 it was again thoroughly repaired, and the ancient tower was taken down, and the ugly brick affair the present generation has known was erected in its place. The parishioners seem to have been ill-served by those they employed, for in 1811 the building had fallen into a bad state, and they had to spend 5,000*l.* upon it to make it fit for the purpose. After that it was, of course, repaired and decorated on various occasions, and has now been taken down to make room for an entirely new church. It was an ugly, styleless brick building, with little in it to interest. Weever has preserved a few of the epitaphs that were in the older church, including one in memory of Richard and Elizabeth Schardeburgh, 1453, and another appertaining to Philip Meawtis, "oone of the secretaries to the Kings Henry VII. and Henry VIII.," who died in the year 1510.

The church recently taken down contained a number of inscribed tablets and other memorials. Some particulars of these were communicated to the *Gentleman's Magazine* by the conductor of this journal at the time his father was engaged in the restoration of the church for the parish, more years ago than he cares to specify. Doubtless a place will be found for many of the memorials in or about the new building. We may mention that in pulling down the old church a few fragments of moulded stonework, apparently of the date of the thirteenth and fifteenth centuries, were discovered built into the walls.

We give a view and plan of the new parish church now in progress, from the designs of Professor G. G. Scott. It is in the Geometrical style, will be built of stone, and accommodate, in the nave and aisles, transept and chancel aisles, 1,143 adults; in the choir, 86; and in various parts of the church, 377 children; making a total of 1,606.

The present contract for the erection of the new church includes only the chancel, chancel aisle, and first stage of tower, which will be carried out by Messrs. Dove Brothers, of Islington, for the sum of 8,375*l.*

It has been proposed to fill one of the windows with stained glass in honour of John Hunter, who was a housowner in the parish; and Newton, who was also a parishioner, has, of course, been mentioned as more imperatively demanding a proper memorial.



CHURCH OF ST. MARY ABBOTS, KENSINGTON.
Plan.

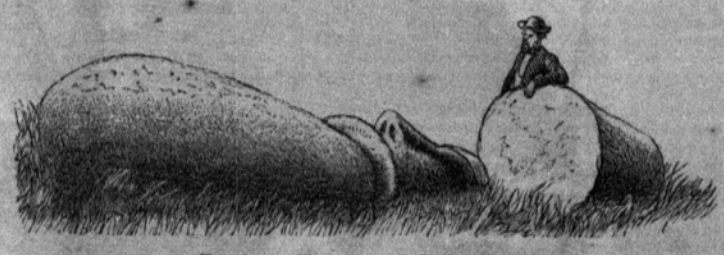
THE SCULPTURED IMAGES IN EASTER ISLAND.

View of Part of Island, with Buried Figures.

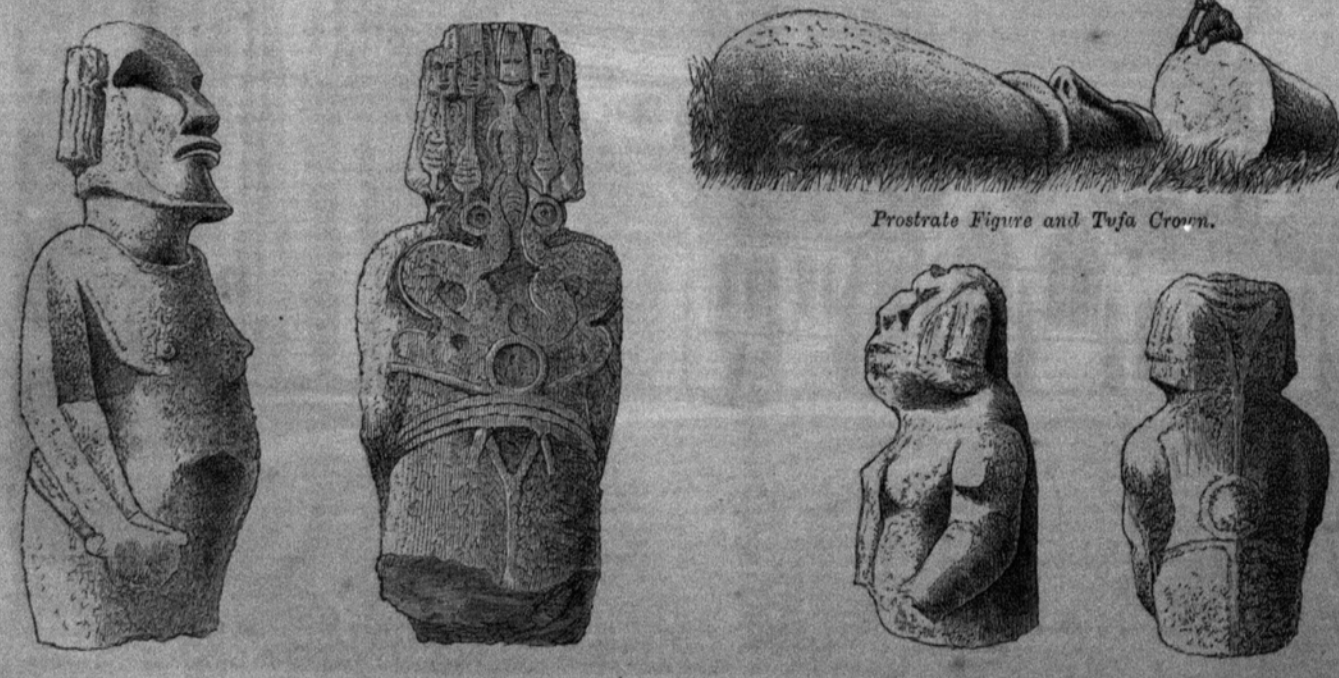
Map of Easter Island,
Mid Pacific.
About Thirty Miles round.

EXPLANATION.

A. { Nearly 120 figures between these
B. { points.
C. { Nearly 150 figures between these
D. { points.
E. Terano-Kou.
F. Terano-Otuiti.
G. Point from which Sketch was taken.
Between this and H,—Village, Crater where Hats are made, and Mission-house.

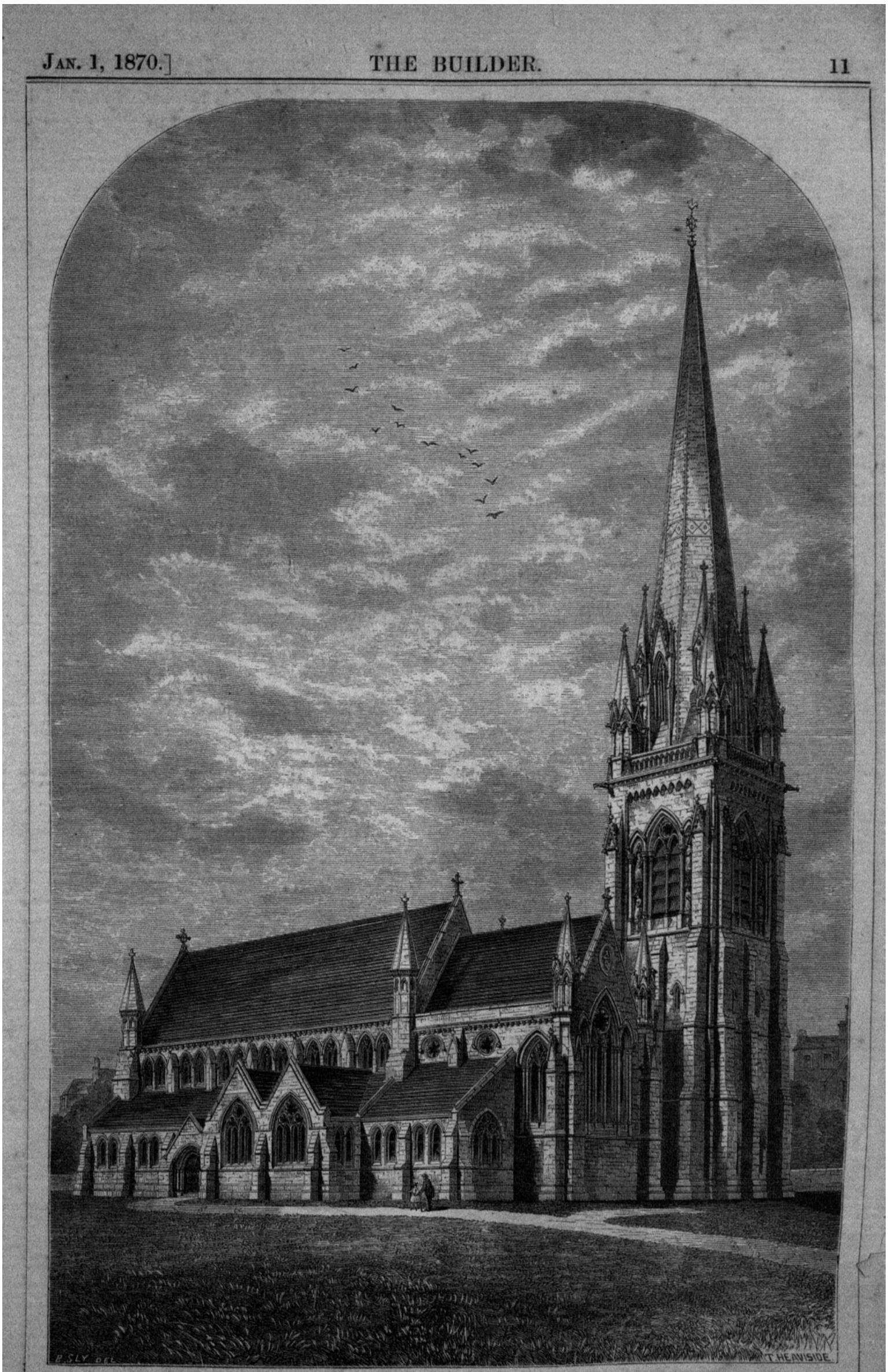


Prostrate Figure and Tufa Crown.



Back and Front View of Two of the Figures now in the British Museum.—Scale, $\frac{3}{8}$ in. = to 1 ft.

[See p. 4, *ante*.



CHURCH OF ST. MARY ABBOTS, KENSINGTON.——PROFESSOR G. G. SCOTT, R.A., ARCHITECT.

ANTHOLOGIA TECHNICA.

MANY inventions are turning up year after year for which would-be inventors claim the credit of original thought. In the building art, as well as in other branches, not a few of the claims put forward by individuals in the interest of the profession, are scarcely entitled to be heard except on the score of judicious revival and application. Many attempts have been made of late years to devise methods of making buildings incombustible, but none have been successful or new. Comparing the present with the past we will instance a discovery related in the *Literary Journal* of 1785, of St. Petersburg, which states that Catherine granted a premium to an inventor for making a pasteboard which no fire could consume, nor water soften; he proposed it as a necessary lining to the dwellings of his country, and for clothing ships of war. The properties of this great invention are hardly a secret at present. The incombustibility was obtained by a preparation of alum. The ancients knew the secret more than a thousand years ago. It was used in the time of Scylla at the siege of Athens. Listen to what Q. Claudius Quadrigarius says:—"Scylla then brought his forces to set fire to a tower which Archlaus had placed there. He came, he piled faggots, he set them on fire, and after an obstinate labour he could not make the tower take fire, as Archlaus had covered the planks entirely with alum."

The idea might be still improved upon if men were not ashamed to acknowledge their indebtedness to those who have lived before them. When our buildings are rendered fire-proof, incendiarism and insurances will be at a discount.

Grecian beauty by many is supposed to be an ideal, notwithstanding the expression of it in the ancient sculptures. But it is a fact that the finest living female models have existed in Greece. Count de Choisel mentions in his Travels in Tenos, one of the Grecian isles, that he found women full of grace and beauty, the finest proportions in shape, and the greatest and most pleasing regularity of feature. In the isle of Naxus, however, the females were uncouth in figure.

It is a question whether beauty or proportion depends altogether on races of people, or is influenced by climate and modes of life. In the British Islands we have seen ourselves types of female form and beauty in the peasant ranks, perfect and matchless. There is little need of our artists going to Greece or Rome for the study of types alone.

At the close of the last century there was a curious watch in the possession of Mr. Francis Marsh, counsellor at law, Dublin, said to have belonged to King Charles I., given by this unfortunate monarch to his chaplain, Jeremy Taylor. It was a plain gold watch, with a single case and a gold dial-plate. The figures on the face were raised. The maker's name was *Jacobus Markwick, Londini*. The watch was highly finished. It had originally no chain, but went by means of catgut. Bishop Taylor had a new case made for it, covered with green velvet, and studded with gold. This studding represented the bottom of a mitre, and a motto was added,—"*Nescitus Horam*." The watch at that time was in perfect order, and a celebrated Dublin watchmaker declared that there was a likelihood of its keeping good time for the next fifty years. It is said that there is another watch which once belonged to King Charles, in the possession of some person in England. Do any of our readers know anything of either of these two old timekeepers?

As antiquarianism and architecture are associated, and as the history of art is the history of civilization, the present note will not be out of place. Ledwich, the Irish historian and antiquary, supplies the following annals as evidence of the origin of the much-disputed, though never finally settled, derivation of the word "Ireland:"—

A.D. 870. King Alfred, in his Anglo-Saxon translation of "Orosius," styles Ireland "Iraland."

A.D. 891. Three Irishmen, says the Saxon Chronicle, came in a boat from Yr-lande: so the Cotton MS. has it.

A.D. 918. The same Chronicle calls Ireland "Yr-lande."

A.D. 1048. Harold flies to Yr-lande.

A.D. 1077. The Danes were shipwrecked on Yr-lande.

A.D. 1080. Adam Bremensis names Ireland "Ir-land."

A.D. 1098. Odericus Vitalis calls the Irish "Irenses."

A.D. 1105. Œlonoth, in his "Life of St. Canute," styles them "Iros."

Ledwich laboured hard to deduce that from the original Celtic Ir-in came the Ira, Iros, Irenses, and Yr-land of the Icelanders, Danes, Anglo-Saxons, and Germans, and the Iris of Diodorus Siculus, and, by a transposition of inne, the Ierne of the other Greeks. Ledwich, however, though he proved the derivation to his own satisfaction, did not satisfy his contemporaries or successors. The Petries, Donovans, O'Currys, D'Altons, and a host of others pulverised the poor doctor's hypotheses into powder, without, however, succeeding in establishing a more accepted theory.

Anything concerning Shakspeare is precious, and is admissible everywhere; for what has the immortal bard left untouched in the domain of nature and art? In a Dublin magazine, published in 1793, a writer supplies the following bit of information in relation to Shakspeare:—

"There lived in Drogheda, about fifty years since, one Guy Harrison, who boasted of his descent from Shakspeare. He said he was his grand-nephew, and delighted in speaking of his uncle. I had this anecdote from a gentleman who often conversed with him, but who was too young to take much interest in anything that related to the immortal bard. Harrison kept a little shop, in which he sold thread, tape, lace, and other small haberdashery—his circumstances were indigent. Should not some inquiry be made concerning the family of Harrison? Perhaps, if he had any children, some of them may be still living."—P. R. R.

We wonder if at this date an inquiry among the oldest inhabitants, or a search through the parish registries of Drogheda, would bring to light any trace of the descendants of Shakspeare. It is strange that Malone, his great Irish commentator, did not drop across this "waif" in his day; if he did, he would likely have hunted up the particulars when such a good chance for doing so existed.

The following Latin lines are written in the margin of page 179 of "Burton's History of Leicestershire." The volume is in the library of St. Patrick, Dublin:—

"Robertus Buxton hic jacet
Paucis notus: paucioribus ignotus—
Cui vitam dedit et morteno
Melancholia."

These lines, as it has been before remarked by another, bear a striking resemblance to the lines of Gray, in his "Elegy in a Country Churchyard," beginning,—

"Here rests his head upon the lap of earth," &c.

The volume is evidently the author's own copy, for his pedigree is thus mentioned:—

"Robert Burton, Bachelor of Divinity, and student of Christchurch, Oxon. Author of 'The Anatomy of Melancholy.' Born 8 of Febr., 1578."

Underneath, on the margin, appears the following:—"Obiit anno 1639."

The School of British Sculpture is not quite so recent as some imagine. The ecclesiastical edifices and monuments in Great Britain and Ireland furnish a proof of a high degree of excellence in stone carving. There is a great mixture of the northern element in both the Anglo-Saxon and Celtic races. In Mallet's introduction to the "History of Denmark," Wormius, Sibbern, and a few others relate the surprising skill of the Northerns in carving, and this, too, with no better tool than a knife. They were also expert at painting in colours with different clays. The Germans were also adepts at this work, according to Tacitus.

The Celts had the same propensities, and they made considerable progress in the art of design. In one of their ancient canons is mentioned how they adorned their skins with ornamental punctures of birds, animals, and flowers. Among the British there was a class of master designers, entitled "The Artifices Plagarum," who not only taught, but practised, the art of drawing.

The Dutch have been great navigators, and as soldiers they have shown considerable bravery on several occasions. They have also beaten back the sea, and built cities upon swamps. Holland has also furnished some ripe scholars. In 1738, one Vander Muelen, who must have been a man of distinction, published at Utrecht a Latin dissertation on the "Rise and Fall of the Roman Empire"—"*De Ortu et Interitu Imperii Romani*." Not ever having seen a copy of this work, we are unaware whether Gibbon is in any way indebted to the Dutchman in the material of his great work. It would be worth the trouble of a search, if there be a copy in the British Museum or other public library.

The Holborn Viaduct is a remarkable work, but, like other important works, the greatest difficulties to its construction are now unseen. Sixtus V. embellished Rome, perhaps, as much as Henry IV. or Louis Napoleon did Paris, taking times and circumstances into account. Our mightiest works are far in the distance, and we shall yet think our river bridges and roadway viaducts' small affairs to boast of. Sixtus restored the fountain of Massa, of which the source was twenty miles from Rome, near the ancient Prænesti, and conducted it by an aqueduct of 13,000 paces on arcades. The New River, for the supply of London, was accounted a great work in the time of Sir Hugh Myddelton, but what is it to-day? Art is still in its infancy, and even telegraphy waddles in its swaddling clothes.

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ROSSO ANTICO MARBLE.

AT a meeting of the Royal Institute of British Architects, November 1st, the attention of the members was called, as we stated at the time, to the introduction of Greek Rosso Antico marble into this country.

Mr. Seddon, on that occasion, pointing to several specimens, said:—It is brought from a quarry in the Bay of Skutari, on the coast of the Gulf of Laconia, near the port of Gytheion, in the Morea, N. Lat. 36½°. Long before it had acquired in Italy the name of *Rosso Antico*, it was known as *Red Laconian* to the ancients, whose excavations are proved by the large blocks cut by them, and never removed, on account of the difficulty of transport across mountains and ravines; but the quarry whence these small specimens are extracted is situated close to the sea, sloping down into the sheltered and tideless Bay of Skutari; with a village of the same name above. This quarry has not been opened for any excavations of importance, and there is as yet no machinery for lifting large blocks which could be cut, or for shipping them. The marble becomes richer in colour the deeper it goes into the bed of the quarry, and is found in large quantities. Lysandros Kaftangioglou, honorary corresponding member of this Institute, a Greek architect, who is known to Professor Donaldson, sent a notice, with some specimens, to the Exhibition of 1851, by order of the Greek Government. He said:—"The largest pieces of this marble are the fourteen steps in the Church of St. Prassede, in Rome, which were intended to be carried to France, to ornament the throne of the Emperor Napoleon I. It was thought till lately the place whence they came was unknown; it was, however, near the sea at Skutari."

Within the last three months this same gentleman has, in a letter, expressed his hope that this red marble, so much sought by the Romans, who made great use of it, should be again employed for works of decorative architecture, *sousbassements*, interiors of churches and palaces, inlaid ornaments, chimney-pieces, standing candelabra in halls, &c., and also says that the opening of the quarry would be the beginning of a great working, very easy, and not expensive, from its admirable position, especially as there are facilities for water transport to London or any other port direct from the spot. Rosso Antico is extremely hard and impervious to the effects of climate. Its proximity to iron produces its hardness and colour. It has been used by Baron Triqueti in the Memorial Chapel at Windsor, and by Lord Walsingham for decorative panels in his billiard-room. The latter is perfectly satisfied with its identity and beauty; and, having carefully compared it, sees no difference between it and some ancient pieces in his possession, which he thinks it is more than probable came from the same locality.

Professor Donaldson remarked that very little was known with regard to the marble Rosso Antico, although considerable quantities were found in Rome in use for decorative purposes, amongst the objects of art on sale in that city. Milizia describes it, in his "Architettura," as consisting of two qualities, more or less coralline in depth of colour, with occasionally white or black spots; he mentions the figure of Wolf wrought in this marble in the Gallery of the Borghese Gardens. Rondelet also mentions Rosso Antico, stating that the two columns in

the Salle d'Apollon, in the Louvre, are of this material, and once formed parts of the tomb of Charlemagne at Aix-la-Chapelle. Professor Donaldson added, that there were several small-sized statues of the same marble in the Galleries of the Vatican and Capitol at Rome, and that much of it had been used in the churches there, being considered from its hardness, beautiful colour, and rarity, as very valuable.

If, therefore, the specimens exhibited were of the same or like quality, the material would be a valuable acquisition for decorative purposes.

Baron de Triqueti has since written a letter to the quarry owner, which may be usefully translated. He says:—

"After you had consulted me on the nature of your marble, and I was fully convinced that you possessed a quarry of true Rosso Antico, which is so rare and so sought after, you had the goodness to offer me gratuitously all that could be useful for the service of her Majesty the Queen, for the decoration of Wolsey's Chapel, Windsor; it is therefore my duty to give you an account of the use I have made of the blocks you sent me, and acquaint you with my observations. It is incontestable, and every one versed in mineralogy will directly admit, that your marble is the identical Rosso used by the Greeks and Romans. It is a calcareous substance, coloured by oxide of iron, containing sand of an extreme fineness, which gives its grain. It is divided by parallel layers of white; moreover, it is very often intersected by blackish veins of delicate network; while the general appearance of the marble passes from a red, almost scarlet in colour, to that of "lie de vin," or "sang-de-bœuf" (wine-lees or blood red), probably according to the quantity or nature of the oxide it contains. I shall not waste my time in mentioning the ignorance of those who think the name of Rosso can apply only to those fragments of marble worked by the ancients. That is not worth speaking about. My experience in marble enables me to see that the small blocks I have used were taken from the uppermost layer of your quarry, and consequently show the unfavourable side rather than the beauties of the material. I had it sawn to use for slabs or bas-reliefs. Your Rosso saws very easily; it is rather less hard, than more so, than the statuary or Sicilian, and the expense of sawing is not more. The surface of the Rosso is very smooth and equal, and is worked with the greatest ease, with chisel, &c. It wears the edges of tools on account of the sand it contains, but not enough to cause any difficulties in working.

Being sensible of the confidence placed in me before you were acquainted, and wishing besides to inform my colleagues, sculptors or architects, of the qualities of this fine material, I have used it in the execution of four bas-reliefs of small dimensions for Wolsey's Chapel. I executed with my own hand four subjects, from the rough to the completion, which I had polished, as is necessary in the sculpture of coloured marble. I then executed two heads in profile, of Tiberius and Herod, after antique medals. This work is quickly done, and the result admirable. I then executed the reverse of two medals, in which greater delicacy was necessary,—Judea Capta and the Roman Wolf medals of Titus,—and was equally contented with the material. The admixture of sand in Rosso, which is so remarkable in the antiques of the Vatican at Rome and the Louvre in Paris, gives an advantage to the sculptor over the marble-worker, by giving solidity to the result and power to the subject. The dark red tone of colour marks the outlines with the force and severity which are so admirable in reddish-coloured bronzes; in short, I found your Rosso possesses the qualities requisite for successful sculpture. Many slabs which are used in the ornamental part of Wolsey's Chapel have taken a sufficient polish; others, less good in quality, have not.

Artistic persons, to whom these details may be interesting, will, I think, easily obtain admission into the chapel, and can see and judge for themselves of the quality and beauty of the Rosso from your quarry. I am convinced, by going deeper into it, that you will obtain blocks incomparably more beautiful. I hope to be enabled to make use of some; and I am persuaded that the discovery of your Rosso Antico, —*the true Rosso, I repeat*,—is destined to be of great service in architecture and sculpture."

An Enlightening Landlord. — Lord Chesham has at his own cost just had all the cottages of his tenants at Latimer fitted up with gas.

THE VENTILATION OF SEWERS.

SIR,—I beg the insertion of the following remarks on a subject of public importance in connexion with the drainage of towns.

It is well known that offensive smells find their way into houses from sewers. The public health often suffers from these noxious emanations. Yet nothing is done in many towns to remedy this evil, beyond placing what are appropriately called stench-traps at the inlets of the sewers, with the view of making them as air-tight as possible; and the consequence is, that the sewers become full of foul gases, which, at all times, in spite of the stench-traps, and especially in favourable conditions of the atmosphere, escape and generate, or aid to generate, fever and disease. In short, the atmosphere of towns is vitiated by the noxious emanations of unventilated sewers, and this is one of the greatest objections to the present system of sewerage. How many, by breathing this polluted atmosphere, are drawn to the dram-shop, the drug-shop, and the grave? Our cemeteries are prematurely full. How many of those who lie there are victims of slow poisoning by an irrational system of unventilated sewers? and how much ill-health among the living is owing to the same cause? Few diseases afflict humanity which are not aggravated by foul air.

How can this evil be removed? By ventilating sewers on the same principle as coal-pits. Connect the sewers of a house with the kitchen chimney (where there is a fire all the year round), and you have an "upcast." Remove the stench-traps from the inlets of the sewers, and they become "downcasts;" or, in other words, a current of air will pass down the inlets of the sewers, along them, and up the chimneys, carrying away all offensive smells to be dispersed in the air above the housetops, and these gases, being lighter than the atmosphere, could not descend again. By this means sewers would be cleared of the mephitic gases evolved from the sewage, and which, under the present system, escape into houses and streets. The cost of this plan would be inconsiderable, and it would not be necessary to apply it to every house.

This plan is on the principle of ventilating sewers in detail. It is opposed to the plan of having a small number of large chimneys erected solely for the purpose of ventilation, which has been tried and failed, for the simple reason that it only removed the gases from one place to another, and created a nuisance at another place. What we want is to prevent the accumulation of sewage gases, to keep them out of our houses, and to pass them off directly into the atmosphere, where they would be diluted and dispersed, and thus rendered harmless. And this cannot be done more effectually than by ventilation in detail. The more "downcasts" and "upcasts," or inlets and outlets there are, the more freely will the air pass through them and overpower their noxious gases.

I may here mention that I have heard it objected to my plan that by ventilating sewers through the kitchen chimneys you run a risk of bringing sewage gases into the house, and I have been told that ladies would not like to go into the kitchen if the chimney were connected with the sewers. This is a mere prejudice similar to that which once existed against the use of coal in houses, for burning which in the city of London a man was hanged in the reign of Edward I.; and Stowe relates that as late as 1600, "The nice dames of London would not come into any house or room where sea-coals were burned, nor willingly eat of the meat that was either sod or roasted with sea-coal fire." The pipe of the water-closet is, however, infinitely more objectionable, as under the present system it is a sort of chimney to the sewers up which gases rise in the same way as smoke ascends chimneys. This objection, too, proves my case. It evinces a dread of sewage gases, and shows the force of habit, which makes people indifferent to a serious danger which has long existed, although they dread an imaginary one. People do habitually what they would dread to do occasionally. They go fearlessly into one small room called a water-closet where there is a continual escape of sewage gases. Yet they would not like to connect another larger room, called a kitchen, with the sewers for fear of an occasional escape. But there is no fear even of that. When a chimney smokes particles of soot are forced down, but the atmosphere has no power to force down gases lighter than itself. And as the chimney causes a draught, which is increased in the day time by the fire, it would if connected with the sewers cause a large quantity of fresh air to pass through them, and render it very improbable for any offensive smell to be received in the house.

ROBERT ELLIOTT.

THE BISHOP OF LINCOLN ABOUT ART.

AT the annual meeting of the Lincoln School of Art recently, the Bishop, in distributing the prizes, urged that art was a most important element in the work of education. It appeared to him that if art did not raise men to a higher stand, it did not fulfil its mission. Art had a moralising, a humanising, and a spiritualising influence. They should endeavour to Christianise art and science, and impart to them something of a higher character. It was the province of religion to spiritualise art, and it was the province of art to illustrate religion. He would endeavour to elucidate this. In the large foundries of this city men were engaged in a laborious work—perhaps it might be called a work of drudgery—but when they were gathered together in the hall of this institution they were raised high above mere mechanical work. They could not too highly estimate the advantages of this institution. It not only prevented the gratification of sensual indulgence, but it provided a salutary preventive of crime, and liberated them from the domination of their carnal appetites, and thus introduced them into a higher latitude and a nobler element. As they were aware, some of the greatest artists were engaged in manual exercises. The first introduction of Hogarth was as an engraver of bills, but, owing to being brought into a school of art, of considerably smaller pretensions than this, he became one of the most successful delineators of the various phases of human life. He also referred to Quintin Matsys, to whose memory a monument was erected at the west end of the magnificent cathedral at Antwerp. If he (the Bishop) remembered rightly, too, one of the most distinguished landscape-painters the world had produced, Claude Lorraine, whose pictures they always gazed upon with pleasure, was the son of a pastry-cook, and for many years languished in obscurity. He was, however, brought into a school of art, and from a pastry-cook became one of the greatest of painters. He rejoiced to find that this school had far out-stripped in the race such places as Lambeth and Newcastle; that it took precedence of Liverpool, Manchester, Sheffield, Birmingham, Dublin, Bristol, and other places; and that it had even eclipsed the two Universities. He had, therefore, a right to congratulate them. But he would remind the students of thi —that a grave responsibility was attached to them; the credit of the institution was committed to their trust, and they would be answerable for maintaining the present position of the school. As had been said by a conqueror of old, to his soldiers, "Ye are my wings, on which I fly to victory," so Mr. Taylor might say to his pupils, "Ye are my wings, on which I fly to glory;" for, without the labour of the pupils, what would become of the industry of the instructor? As he (the Bishop) was about to distribute prizes to his younger friends, he wished to impress upon them that nothing could be done without indefatigable diligence. Many persons erroneously supposed that they could grasp success in a moment, and they accordingly did not give themselves the trouble of submitting to that careful, indefatigable labour which was absolutely necessary to the artist if he would achieve success. If the students would be successful as artists, they must never let a day pass without labouring at art. It must be with them in their walks, and in their private meditations. They must never depart from it, and it would never depart from them. If they did this, then, by God's help, they would be successful. Something had been said of the delightful views, seen by the educated eye, even in the flats of Lincolnshire. He was satisfied that there were beauties in this English Holland. He might, perhaps, be allowed to make a reference to a relative of his own, the late Poet Laureate, who left his beautiful home amongst the Lakes to visit him at Cambridge, and who told the speaker, in reply to his inquiry as to what beauties he could see in the flats of Cambridgeshire, that he lived in a beautiful country in order that he might see beauties everywhere. The late Sir Joshua Reynolds had said that he saw no beauties in Raffaelle and Michelangelo until he had studied their works, and then he appreciated them, and became enamoured of their beauties and excellences. The great use of material objects was

to lead them to the study of ideal objects. They might copy objects exactly, but if they did no more than this, they would, like photographers, be merely machines, working machines. They must endeavour to have an ideal in their minds, and to arrive at the ideal mould they must go to that which was spiritual and unseen. As Michelangelo, who was not merely the greatest of sculptors and painters, but one of the greatest of poets, had written :—

"Heaven-born, the soul a heavenward course must hold:
Beyond the visible world she soars to seek
(For what delights the sense is false and weak)
Ideal Form, the universal mould.
The wise man, I affirm, can find no rest
In that which perishes; nor will he lend
His heart to aught which doth on time depend.
'Tis sense, unbridled will, and not true love
That kills the soul: love betters what is best,
Even here below, but more in heaven above."

ARCHITECTURAL ENGINEERING.

THE numerous instances of failure in engineering structures of late years seems at length calculated to point to the expediency of further researches in relation to the principles upon which that so-called science is conducted.

An inquiry of this nature would be likely to embrace the present condition of many important erections which subserve the exigencies of public requirements; and probably foremost in this list might be reckoned the tubular bridge across the Menai Straits. The condition of that structure has for years past been such as to cause considerable apprehension in certain directions, and it is fairly questionable whether the circumstances may not be grave enough to render the subject entitled to more than passing comment. It may be customary, as we may be aware, in analogous cases to await the occurrence of some actual catastrophe; but instances may suggest themselves of sufficiently threatening importance to admit of departure from more jealously observed rules.

From the statement of late authorities upon the progress of engineering science, the development of it would be made to appear coincident with the more extended application of iron to structural purposes.

As a constructive art, perhaps, the value,—or, it may be said, the more essential features,—of scientific engineering might be capable of being closely identified with the employment and adaptation of iron in the direction intended, subject or open to improvements in the method of its application corresponding with changes which may have been from time to time introduced in connexion with its production and manufacture.

The practice of modern engineering could, in accordance with these views, and in an important sense, be said to depend upon the theory and determination of the elastic properties of iron. As one of the more singular qualities of this material, it has been discovered that its resistance is not constant or uniform when exposed to dissimilar strains. This is true of its molecular cohesiveness when pressed as of its adhesive properties when pulled. It seems to possess no elements of constant strength, even where it may not be subjected to dissimilar strains. A bar of iron, which might remain intact under a gradually applied strain of 30 tons, would give way under a suddenly applied strain of 30 or 40 tons, as the case might be, and steel has, under strains of this description, been known to have possessed fewer elements of strength than iron, it being susceptible of ready fracture by a trivial blow, if suddenly applied.

It is not without a certain recognition of these qualities that the art of building in iron has been sought to be more widely extended, and their recognition does not necessarily exclude the consideration of other associated properties of iron of a more or less favourable character, perhaps, and which may deserve to be attentively weighed in instances of its adoption.

The stability of suspension structures, which are believed to well exemplify the general properties of iron, as well as affording instances of its more favourable appliance, is eminently dependent upon the assumed elastic properties of the materials of which such structures may be formed, and probably there may be but few constructions in which iron is seen to be largely employed which do not exhibit at some parts, if not at cardinal parts, the elements of the suspension principle.

From the inherent qualities of iron, it would seem to have been derived that greater advantages may be claimed as to its adaptation in proportion as it may be applied constructively to sustain pulling or tensile strains.

Occasions may be adduced, no doubt, of its employment in other forms as in the roof of the new terminal station of the Midland Railway, in vertical supports, compression arches, and in the more recently projected system of continuous tubes.

What we would more especially note at this point is that it would appear to have been unequivocably shown that the action or ultimate strength of equal quantities of iron and in replicate forms varies as to the method in which it may be employed, and that the difference is in favour of its application in its tensile capacity.

The variation in the degree of energy or strength of resistance which iron is seen to possess when it may be employed respectively in the form of a normal or inverted arch, while embodying one of its more obscure properties, may be taken to indicate the economy and expediency of certain modes of its adoption as a building material.

A beam of iron placed over a certain span would, in proportion to its length and weight, be accumulating the elements of eventual rupture; while one-twentieth part of its substance, if suspended above it, would by connexion with the beam admit of the passing over of superadded loads. It was proposed, we believe, some two or three years since, by Mr. Cowper, of the Institution of Civil Engineers, to construct bridges with inverted instead of upon normal arches in iron, as an intermediate class of erection between suspension and ordinary arch-formed structures of the nature in view; but Mr. Peter Barlow observes that if the back chains of a suspension bridge were removed, and a compression tube applied uniting the extremities of a curved suspension chain, four times the quantity of metal would be demanded to obtain equal rigidity, and it appears that this costly element would not be altogether escaped in inverted arch bridges.

The deflection of beams or girders from their own weight alone, and their increased deflection by superadded weights up to the point of rupture, is said to coincide with the development or generation of series of strains whose direction may be shown, and which, arriving at certain localised parts, may be seized and conveyed away by appropriate connexions and means to the relief of the structure, as electricity may be carried away from accumulating points by conductors. It is asserted that no reliance may be placed upon the section of metal required in cases of large span, and that by no calculation can the point be arrived at with certainty when distortion will commence; but the observation is more intended to apply, as regards iron structures, to those not included in the suspension system.

Architecturally considered, all attempts to blend modern engineering theories with more established usages of building have resulted less happily, perhaps, than could have been desired.

Especially with reference to disasters incident to the construction of roofs, perhaps where iron may have been largely employed in conjunction with masonry, more particularly may this be noted. The distrust which at one time culminated in the proximate fall of the building which was erected for the purposes of the International Exhibition of 1862, at South Kensington, may be well borne in mind. The apprehension to which that circumstance gave rise has been scarcely diminished to the extent that could be wished by analogous occurrences of later date. In this direction it would seem, in an engineering point of view, that eminent scope would be afforded for further inquiry into the merits of the system embodied in the St. Pancras Station.

No ordinary arch-formed roof in iron of great span would appear to be intrinsically or necessarily safe. The rupture of the tie-bars, by the tendency of the limbs of the arch to spread, or the contraction of the span and demoralisation of the members supporting the structure by a negation of the action which they may have been originally intended to fulfil, are among some of the causes tending to disturb and imperil the stability of modern iron roofs of the description alluded to.

These elements of instability are observed to have been well avoided in the St. Pancras roof. This structure is in the form of an obtuse pointed Gothic arch, composed of two immense limbs of built-up ironwork, uniting in the centre of the span, at a height of 160 ft. from the springing, and may be considered to be altogether independent of the architectural elements by which it is surrounded. The ribs, comprehending a span of 245 ft., are continued in a series of twenty-five principal and a corresponding number of inferior ribs, which constitute the main frame-work of the building; and apart from its being the largest roof yet constructed, it possesses claims of scientific importance as the direct antithesis of that system which is advocated by the engineer's brother, Mr. Peter Barlow, as to the economical and practical adaptation of iron to structural purposes. Reverting for a moment, and in view of the late occurrence at King's College, to the self-inflicted rupture of continuous horizontal girders or beams, such members, if altered to the form of an arch, would have the point of probable rupture translated to new localities, and admit of a certain margin of useful effect.

The direction of the tendency to rupture might then be regarded as having been diverted down the opposing limbs, accumulating and being retained or conveyed away at their base. Should sufficient extent of metal, however, not be provided at the extremities of the limbs within which the accumulating and applied strains could be taken up, the structure would rupture at these parts from compression. To meet this a pyramidal extension may be noted at the base of the arched limbs of the Midland roof, and may be compensated for in other arched form structures in iron by spandrels and other substituted means.

The study of the science of engineering has been compared by Mr. Fowler to the study of the science of medicine. The resemblance, however, would not appear to be intended to be too widely conveyed, and it forms no part of our duty to seek to inquire how far or not the comparison should be extended.

Mr. Fowler observes, that "although we know from history that men have existed from the earliest times who have been distinguished by great mechanical capacity, remarkable skill in working materials, profound science, and constructive knowledge; yet it is only during the present century that civil engineering can be considered to have become a distinct and recognised profession. Now, however, it has assumed the position of an art of the highest order. Perhaps we may, without arrogance, be entitled to claim for it the title of a true science. Many attempts have been made to define and describe a civil engineer in a few general words, but all such attempts have been more or less unsatisfactory."

While some might, perhaps, regret the irresolution which has been declared as to the discovery of some more intelligent designation of an important body, a less unsatisfactory approach may be made in this direction in proportion as their labours extend over a wider experience. Be this as it may, it would appear but a capable hardship, should a science confessedly of such immaturity be led in order to steer altogether clear of any imputation of arrogance, while retaining all the elements of a science, postpone its claims, for the time, to the dignity and confidence of a true one. It is a science which, perhaps, cannot yet be said to be so free as might be wished, from occurrences that may associate themselves in some degree with the attempts to which Mr. Fowler has referred, if not to point to the expediency of a suspension of judgment as to the position which should be assigned to it amongst leading arts.

The annals of engineering, although voluminous, do not appear to bridge over any wide historical interval, as Mr. Fowler has remarked, but it is said rather to be founded upon the discoveries of comparatively recent times. Mr. Humber says as the reader escapes from the preamble of his subject that "he will then come to the period when the rude constructions of the inhabitants of China and the Himalaya mountains of India suggested the mode of passing over chasms and rivers by means of a suspended way." From this point one is briefly led to the erection of the first iron bridge over the river Tees. After the erection of this structure, it is stated that more than half a century had elapsed, when we arrived at what is regarded as the culminating point or crisis of practical engineering embodied in the erection of the Menai Bridge.

The degeneration of this structure has long attracted attention in engineering circles, and may be calculated shortly to invite a consideration of the means by which it may be strengthened or superseded by an improved connexion. As we have already noted, the science of construction in iron or architectural engineering is said to have taken its more prominent features

if not its accepted date, from the period of the erection of this structure. But many of the conclusions which were then arrived at no longer coincide with the tendencies of modern engineering with reference either to the ascertained strength and properties of materials or their mode of application.

Mr. Clark states that "with respect to the use of the present suspension bridge for the proposed traffic it was found difficult to devise any means of sufficiently strengthening it that did not involve an almost entire reconstruction, and great difficulty was similarly found in attempting to render any suspension bridge sufficiently rigid for railway traffic by means of ordinary trussing. When the passing load is small compared with the weight of the chains and of the structure itself, there is, indeed, no difficulty; but the construction of a platform, 450 ft. long, sufficiently rigid for railway traffic, almost amounts to the construction of the tube itself." These difficulties will be seen to have been overcome, and the conclusion which was arrived at altogether set aside in presence of the span of Niagara Bridge, which is nearly twice 450 ft., and has yet been rendered sufficiently rigid for the purposes of locomotive traffic, to the exclusion of all resemblance to a tube, and affords a notable economy of material as compared with the Menai structure.

There are also more modern instances of improvement. Since the time of Brunel, who did with reference to the flexible adaptation of iron what Sir Charles Fox did with that material in another form in the Exhibition of 1851, the application of iron to building purposes has undergone wide and important changes, and the science of engineering cannot yet be said to have reached any determinate form. It is a quality of engineering science to adapt its designs to special circumstances, and consequently it never ceases to be experimental—a circumstance which is greatly to be regretted, perhaps, in the interests of that science. This may be instanced in the curious and interesting succession of bridges lately erected over the Thames in cases even where the circumstances and the requirements were alike; and it is this experimental feature which, in our view, somewhat detracts from the practical value and importance of the science, and would in a measure naturally be the case where every newly-projected undertaking can be regarded as upon its trial.

From more recent investigations upon the strength and durable properties of iron, it is possible that its application in a structural point of view may be brought more and more within the limits of an exact science, but until that time arrives those who may be concerned in important architectural works will be more solicitous as to the ultimate advantages of its more extensive adoption.

Standing alone as an independent and important branch of constructive science, the art in view may advance more truly to its aims, and eventually claim that recognition which Mr. Fowler appears at a loss to imagine should by some portions of the public be now withheld from it, and which might well be attributed, as his words could at the present moment be taken to suggest, to bewilderment either in or out of the profession.

THE LABOURING CLASSES IN AMERICA.

THOMAS CONNOLLY, stonemason, who went to America on the part of brother-workmen, we believe, to report on the position of the trades there, has written a sensible letter to the *Telegraph*. We reprint a part of it referring to the houses of the poor and the labouring classes:—

The rich can be well housed everywhere; but how fares it with the poor of New York, of whom there are quite as many in proportion to the inhabitants, as in any other city of the world? You will find as many idlers around the liquor-stores, as many beggars and Arabs in the streets, and more people crowded into the tenement houses than I ever witnessed in the most populous parts of London. In fact, all the working people live in those tenement houses from five to seven stories high, of which there are some 20,000 in New York. In most of these houses as many as thirty-six families live; and I was in one of about 24 ft. frontage, which contained fifty-two families. The people here are packed as close as herrings in a barrel, and are in some parts twice as many to the square mile as in any city of Europe. In their construction not the slightest attention is paid to light or ventilation. They are usually four rooms in depth,—the centre ones lighted from the front and back rooms. You have to grope your way up the staircase; for it is without light from top to bottom. The water is plentiful enough, and always on. New York receives 60,000,000 gallons per day from the Croton River, about thirty miles off; but from the rocky nature of the ground upon which many of the houses are built, it is impossible for the drainage to be perfect; and were it not that New York is swept by the clear sea breezes, I do not hesitate to say that most of those houses would be hotbeds of misery, disease, and death—more especially in the houses where the poor tailor is worked to death, where the son of St. Crispin has to work far into the night to earn a living, and the poor seamstress, "weary and worn," as in the old country, is "plying her needle and thread" to provide a scanty living for herself, and, perhaps, her little ones. Another Peabody is wanted here; and some say that he will be found in Mr. A. T. Stewart, who, by a happy coincidence, is a native of the British Isles. I learn that he contemplates building homes for working people at some distance from the City, and constructing a railroad to them. I hope, for the sake of my fellow working-men here, that the statement may be true; but, in my opinion, they could do a deal for themselves if they had the will; for across the rivers to Brooklyn and Jersey there are some twenty ferry-boats running every five minutes, and in those places homes are better and cheaper. But men will be near their work if they can, even at the sacrifice of health and life. Those miserable, uncomfortable, unhealthy flats in the tenement houses are let at from 30 dollars to 40 dollars per month; so that a working man with a wife and a couple of children cannot get the poorest house accommodation for less than 12 dollars per month. The houses are all heated with stoves, in which anthracite coal at 12 dollars a ton is burned, and on which the cooking is all done. Every family has its own stove, which they remove like any other piece of furniture, when about to leave; they economise fuel, and heat the rooms much better than open fireplaces; and they could be used with much advantage where fuel is dear in England. It fares little better with single men and women, who, through emigration, are in vast numbers here; they live in boarding-houses, which are nothing more than one of those tenement houses, fitted with beds in every room except one, on the ground floor, which is set apart for meals. The inmates pay from 6 dollars to 7 dollars a week, and I admit that the food is very good. There is meat at every meal; breakfast before they go out at seven in the morning, dinner at twelve, and tea at six p.m.,—no supper, like working men in London. A large bell summons all to meals, and if you fail to attend you get nothing till the next time. On Sundays or holidays you keep your bedroom, or go out. Food here is about the same price as in England, but not so good. Without entering into details, which I must reserve for future letters, when I describe the condition of the trades, my present conviction is, that a working man in any trade here does not enjoy so much social comfort as a man of the same trade in England, with both in full employment.

THE SPACE AT THE MANSION HOUSE.

WITH reference to the memorial of the Royal Institute of British Architects pointing out the necessity and desirability of leaving the triangular piece of ground as it is, unbuilt on, and the refusal of the Metropolitan Board to accede to this request, it has occurred to me that the Metropolitan Building Act, 1855, compelling streets to be of not less width than 40 ft., ought effectually to stop the present scheme for building on it.

NEMO.

EXPERIMENTS ON TIMBER.

AN engineer writes,—

Having been permitted, through the courtesy of Messrs. Bayly & Fox, timber merchants and owners of saw-mills and creosoting works in Plymouth and at Oreston, to be present at the inspection of a number of pieces of wood prepared to test the value of various processes for the preservation of timber for sub-marine work, I send you the enclosed statement of results, thinking it may be interesting to many of your readers. The experiments have been made at the Great Western Docks here in still water, 20 ft. deep. The wood has been constantly covered for nearly two years and a half. The blocks have hung one over another on a chain which passed through them; a distance of about 10 in. being kept between each, and the whole attached to a heavy mooring, and sunk. Having again sunk the whole, it will be very interesting to note the effect which longer immersion will have upon them. My own opinion leads me to think the value of the creosoting process over any other will be more apparent each year, and that at the end of a further term of two years there will be little, if any, of the unprepared pieces of pine remaining.

The timber was sunk in the Great Western Docks, Plymouth, on the 19th of June, 1867, and examined on the 9th of December, 1869.

Preparation of the Timber for Experiment.—The timber to be creosoted was dried under a shed, with full circulation of air, for six weeks, then creosoted under pressure, from 45 to 50 gallons of oil to the load being absorbed.

Timber to be kyanised was dried as above, then steeped in a solution of corrosive sublimate during 24 hours for each inch in thickness. Three pounds of sublimate per load (50 cubic feet) being used.

Timber for the sulphate of copper process was dried as above, then steeped for 14 days in a solution of sulphate of copper, 1 lb. to 8 gallons of water being used.

Timber unpreserved was also dried as above.

Description of Wood.	Scantling.	How prepared.	Condition on Examination.
Quebec Yellow Pine	10×10×5	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Very slightly worm-eaten.
Ditto	,,	Unprepared	Much worm-eaten and reduced in size.
Ditto	,,	Sulphate of Copper	Much worm-eaten.
Quebec Red Pine	10×10×5	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Much worm-eaten and reduced in size.
Ditto	,,	Sulphate of Copper	Much worm-eaten.
Memel Timber	10×10×5	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Very slightly worm-eaten.
Ditto	,,	Unprepared	Much worm-eaten.
Ditto	,,	Sulphate of Copper	Rather worm-eaten.
American Oak	6×6×5	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Slightly worm-eaten.
Ditto	,,	Sulphate of Copper	Very slightly worm-eaten.
American Elm	6×6×6	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Much worm-eaten.
Ditto	,,	Sulphate of Copper	Very slightly worm-eaten.
English Elm	6×6×6	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Much worm-eaten.
Ditto	,,	Sulphate of Copper	Very slightly worm-eaten.
English Oak	6×6×6	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Very slightly worm-eaten.
Ditto	,,	Sulphate of Copper	Perfectly fresh and sound.
English Beech	10×7×2	Creosoted	Ditto
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Much worm-eaten, with growth of weed.
Ditto	,,	Sulphate of Copper	Slightly worm-eaten, with growth of weed.
Swedish Timber	10×8×5	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Ditto
Ditto	,,	Unprepared	Much worm-eaten and reduced in size.
Ditto	,,	Sulphate of Copper	Much worm-eaten, with growth of weed.
Pitch Pine Timber	10×10×5	Creosoted	Perfectly fresh and sound.
Ditto	,,	Kyanised	Very slightly worm-eaten.
Ditto	,,	Unprepared	Much worm-eaten, with growth of weed.
Ditto	,,	Sulphate of Copper	Slightly worm-eaten, with growth of weed.

THE METROPOLITAN RAILWAY.

DESPITE the complaints that have frequently been made, and are still occasionally made, of the management of the Metropolitan Railway, the number of passengers who have availed themselves of its trains has steadily increased from the date of its opening. In the first year the number of passengers carried over the line was 9,455,175. During the year just closing it is estimated that the number of people conveyed over the system—very much extended since the last-mentioned date—will be no less than 40 millions! The whole number of passengers who will, it is estimated, have made use of the line up to the end of the year 1869 is just over 150 millions! These figures are too large to convey any very definite impression to the mind. The greatest number of workmen who have been carried by the trains appropriated to their use in one week has been 18,675, and the number carried in the half-year ending June 30th was 342,174. A good deal is being done to improve the ventilation of some parts of the tunnel, and of one or two of the stations. At Portland-road, for instance, the tops or coverings have been taken off the two domes, and by this means a constant supply of fresh air is admitted into the station. At Gower-street a still greater improvement has been effected by the purchase and demolition of two houses, one on either side of the line. In this way open access has been provided to the platforms, and this, which was until lately the worst, will now be one of the best ventilated stations on the underground portion of the railway. The construction of the St. John's-wood branch was a great aid to ventilation; and a scheme has already been sanctioned by the Board of Directors for making an opening in the roof between Gower-street and King's-cross.

MRS. TAIT'S ORPHANAGE, ST. PETER'S, THANET.

THE foundation-stone of a permanent home for orphans, initiated by Mrs. Tait, wife of the Archbishop of Canterbury, has been laid on a site near the Archbishop's marine residence, Stonehouse, St. Peter's. We understand it will be in the Gothic style, and will be 100 ft. long and 60 ft. wide. The dressings will be of Doulting stone, the internal walls being built of brick, faced with flints obtained in this neighbourhood. Red bricks will be introduced as bands and relieving arches; and the entire building will be covered with tiles. Accommodation will be provided for about sixty orphans belonging to the Canterbury and London dioceses, who will, under the direction of Mrs. Tait, be in the care of sisters from St. Peter's, Clapham. A chapel will be erected, 59 ft. by 18 ft. The cost of erection will amount, it is estimated, to nearly 6,000*l.*, of which 2,600*l.* have been obtained up to the present time. The building is to be finished and ready for occupation by April, 1871. Mr. J. P. Seddon is the architect; and Mr. Thos. Williams, of Kentish Town, is the builder.

THE GRANITE COLUMNS OF THE HOLBORN VIADUCT.

SIR,—The publication of the report of the engineers appointed to examine the piers of the Holborn Valley Viadnct Bridge over Farringdon-street, affords to the proprietors of the Ross of Mull Granite Quarries, from which the red granite of the piers was quarried, the opportunity of explaining the cause of the giving way of these stones, and inquiring publicly what departure from Mr. Haywood's original design is referred to in the report of Messrs. Clark, Bidder, & Harrison. I send you copy of tracing of the piers, furnished to me by Mr. Haywood's orders nearly three years ago. This tracing was furnished in order that I might give an estimate to him of the probable cost of these piers. You will observe in this tracing joints are shown at 12 in. from the bottom of the Ross of Mull granite, and at 9 in. from the top of the same granite. As it has been proved that the fracture of these 12-in. and 9-in. stones has been caused by hollow beds, and the improper use by the contractors of detached bits of lead, instead of a continuous sheet or ring of that metal, the matter that I wish now to elucidate is, that these comparatively thin stones upon which the whole weight of the superstructure would be imposed formed part of the original design, and the reason for that being the case.

When the design was shown to me in February, 1867, and the time (about twelve months thereafter) within which the work was to be finished was named, I represented that it would be much easier to have the work done in the time were the piers circular in form instead of the form shown in the drawing; the reason of this being, that the time taken by the masons in preparing, and by the machine-men in polishing, would be considerably shortened by the adoption of the circular form. To this Mr. Haywood would not consent; therefore the thin and, unless carefully laid, weak pieces of stone were retained in the design.

I have frequently admired the patience with which the inhabitants of London submitted to the great inconvenience of the opening of this noble Viaduct being so long deferred, mainly that the piers of this bridge should be angular instead of circular, and the great simplicity with which Mr. Deputy Fry explained that the delay was from the difficulty in getting possession of the ground, ignoring the fact that the arches of the roadway both east and west of Farringdon-street were completed many months before the bridge, the land for which was to be had for the taking. Mr. Fry has been rewarded by the 500 guineas' worth of plate, and the public by the sight of fractured piers.

The proprietors of the Ross of Mull granite quarries are too well aware of the excellent qualities of the stone to fear much loss from the exaggerated reports of the damage done to these piers. We knew that when the truth came to be known, it would be found that the stone was not at fault.

The massive columns of Blackfriars Bridge were taken from the same part of the quarries; and I have been informed by Mr. Carr, the engineer of that structure, that he ascertained by experiment with a polished piece of Ross of Mull granite, 3 in. in diameter, *evenly bedded*, that the crushing point was nine tons per square inch, or one hundred times more than the weight borne by the fractured piers at Farringdon-street.

G. W. MUIR.

P.S.—It is necessary I should explain that although the fractured stones were taken from the quarries at the Ross of Mull, the proprietors are not in any way responsible for the quarrying, dressing, polishing, or fixing of these stones, these operations having been undertaken by the contractors for the Viaduct.

LANDLORD AND TENANT.

SIR,—The case of Davies *v.* Remmett, reported in your last issue, in which the jury found a verdict for the landlady of a house let furnished, but more or less uninhabitable by reason of defective drainage, the tenant relying on an implied warranty, is instructive, as confirming in degree the obliteration of a nice distinction in our truly feudal laws of landlord and tenant,—laws made evidently by legislators who occupied the former rather than the latter position. That there is never any covenant or promise implied at law on the part of the landlord on letting an *unfurnished* house that it is reasonably fit for habitation, is clearly established; but that, on the contrary, there is such an implied warranty on letting a *furnished* house, is imagined by many to be settled law; and so Lord Campbell ruled. Judges, however, differ on the second point, and have since differed, the balance now being against the tenant. Cole, in "Woodfall," last edit., says,—"It was once decided that there is an implied condition in the letting of a furnished house that it shall be reasonably fit for habitation, and not so infested with bugs as to make it uninhabitable. But such decision is not to be relied on: it has been greatly shaken, if not overruled, by subsequent cases." Archbold, third edit., reiterates the above cases, adding, "That, at all events, if the house be let (furnished) upon lease, there is no such implied warranty. And the better opinion seems to be, that the only implied agreement upon the part of the landlord is for quiet enjoyment, in the ordinary legal sense of that term; that is, without disturbance by the landlord or any person lawfully claiming under him. An agreement letting for only one year, or for a less term, may, of course, amount to a lease; and, to be on the safe side, as Lord Wensleydale observed, in an important judgment touching an unfurnished house, "When parties mean that a lease is to be void on account of unfitness of the premises for the subject for which they are intended to be used, they should express their meaning."

E. L. TARBUCK.

THE THEATRE.

Covent Garden.—In respect of art, the pantomime at this house, "The Yellow Dwarf," stands at the head,—an easy first. It is, in fact, a remarkable work. The first scene, "The Wicked Haunt of the Yellow Dwarf" (painted by Dayes & Caney), with its weird rock-cut figures, and the extent of its cavernous depths, is an artistic production; though how a Haunt can be wicked, unless the H is there by mistake, we do not know. The same artists also supply an effective scene of the Royal Gardens, and a view of the Crystal Palace from the Gardens, for the harlequinade. The Gardens of the Palace, by Mr. Telbin, jun., the Haunt of the Houris by Mr. Hawes Craven, and the Transformation-scene by Mr. Julian Hicks, would each make an exhibition cheap at a shilling apiece the first two, and half-a-crown the third. This last, termed the Roses of Fairyland, is brilliant and refined. When we add that the groupings have been arranged by Mr. A. Harris, the words written by Mr. Byron, the costumes designed by Mr. Matt. Morgan, and that all the parts are pleasantly filled, Mr. F. Payne's *Twitterine* being the most remarkable, we shall have said enough to send many to Covent Garden who do not usually care for pantomimes. Mr. W. Telbin, we ought to have mentioned, has supplied a view of the Thames Embankment and the Houses of Parliament, which is a perfect picture.

The Surrey.—We must give a warm word of praise to Mrs. Charles Pitt for the improved taste observable in the Surrey pantomime this year. The scenery, by Mr. Albert Callcott, and the dresses are altogether admirable. The transformation scene is gorgeous.

Intended Theatre, Leicester-square.—The proposed elevation of the theatre about to be built, it is asserted, on the north side of Leicester-square, and described in our pages some weeks ago, is a very poor affair, as unlike a theatre as it is possible to conceive.

BREAKAGE OF GLASS IN BLANK WINDOWS.

BELIEVING I have now discovered the real cause of breakage of the black enamelled glass in blank windows at Longleat (referred to in my letter of the 20th March last), I feel it my duty to ask you to make it known through the *Builder* for the benefit of others.

I examined some of the damaged squares during a hot day, about Midsummer, and found them very hot to the hand in the centre, but comparatively cool round the edges, where they were inserted in the stone mullions. I was at once struck with the conviction that the breakage was caused by unequal expansion, the central portion expanding more than the edges, producing a fracture of this kind, the glass seldom falling out. I have since inserted a number of squares in wood fillets flush with the stone mullions, the glass being stopped in as in ordinary sashes. These stand well, none of them being broken.

W. BUCKENHAM.

FATAL ACCIDENT AT THE NEW THEATRE, BRISTOL.

MOST of our readers will have heard of the terrible accident at the new theatre in Park-row, Bristol, which resulted in the death of eighteen persons, and the injury of several others. The entrance to the pit and gallery is down a passage about 20 ft. wide, leading from Park-row. There is a steep gradient from the level of the road, and at the bottom of the passage there is a sharp turning leading at right-angles to the gallery on the left. The door to the pit is situated also on the left-hand side, but about 2 ft. higher up, and consequently nearer the roadway. It is impossible to compute the exact number of persons in the passage; but it is stated by several policemen who were near the spot that nearly 2,000 persons were endeavouring to gain admission either to the pit or gallery—the crowd extending some distance into the roadway. As the minutes wore on the crowd grew denser, and the pressure from the outside packed the mass in the passage closer and closer altogether. Directly the doors were opened those behind pushed forward, heedless of the cries of those in front of them. A policeman, desirous of restraining the advance of those behind, called out "Fire!" A panic was the result. Men, women, and children immediately made a frantic effort to drive back those coming in. People were pushed down and

trampled under foot, and when once down it was almost impossible to recover their footing. In some of the newspapers we have seen the width of the passage, 20 ft., referred to as increasing their surprise that the accident occurred. The fact is, however, that in this width of passage was the element of danger, increased by the steep descent. Any arrangement which permits a mass of people to be clustered together as they were here is a bad one. The French for years have shown us an example by forming the persons waiting into a narrow *queue*, which is controllable at any point; but the lesson is lost upon us. Every day it becomes more obvious, especially in the face of the existing mania for building theatres and music-halls in London, that proper regulations and strict supervision are needed with reference to the erection of public buildings.

LEEDS BRIDGE COMPETITION.

GREAT dissatisfaction is expressed on the ground that, although it had been stated no one connected with the corporation would compete, their surveyor, with whom various competitors had discussed their views, has been allowed to do so. Exception is taken, too, to Mr. Barlow's selection of three designs, all requiring, according to his own showing, important alteration. The joint engineer of Blackfriars Bridge, who is a competitor, has published some strong and pointed assertions on the subject.

ETYMOLOGY OF THE WORD "HOLBORN."

THE recent opening of the Holborn Viaduct has naturally awakened fresh interest in the etymology and application of the word Holborn. Among others, the *Illustrated London News* has lately taken up this subject; it is also incidentally alluded to in Mr. Trollope's magazine, *St. Paul's*, in the article called "The Thames." Both writers adopt the old opinion which considers it a corruption of *Old*-bourne. This appears to me a great misconception; I do not deny that it has been called Old-bourne, but not correctly so, as I think.

The prefix *Hol* in Holborn really means a hole or hollow, as in the analogous cases of Holbeck and Holbrook: places in England, named in a similar way, bourne or burn, beck, brook, being synonymous words for a small stream of moving water.

Holborn is thus mentioned in Domesday-book, the old Norman survey of England, compiled by orders of William the Conqueror; it is there recorded that "the king has two cottiers at *Holeburne*, who pay twenty pence a year to the king's vice-comes [sheriffs]." There can be no doubt that Holeburne, in Ossulstone hundred, Middlesex, is meant for the Holborn of the present day; and it would, therefore, appear that "Hol" is the older, and more correct form than "Old;" the use of which latter form served to mislead Stow, the chronicler.

Ald, the Saxon form of Old, could not have been corrupted into "Hole," so near to Saxon times as A.D. 1086, when the great survey was completed.

A. HALL.

RAILWAY AND TRAMWAY BILLS, 1870.

THE budding-season, so to speak, of the Private Bill business of the coming session is now past, copies of the Bills to be petitioned for having been lodged as required by Standing Orders on the 23rd of December current. The number of Bills deposited, 239, is considerably larger than the number lodged last year—212; but the number of Bills involving new works is considerably smaller. The latter class of Bills are encumbered by the additional Standing Order that the plans of such works, with books of reference to the property involved in the construction, have to be lodged in the Private Bill Office on or before the 30th of November.

In the approaching session ninety railway Bills will be petitioned for, and twenty-two tramway Bills. Many of the railway Bills relate to abandonment of authorised works, extension of time, and "capital" arrangements; but comparatively few are for new works, and of these only a small number are for schemes of engineering importance. Amongst such may be named the Tay and the Severn Bridge schemes, and the East and West Metropolitan Junction Mansion-house Railway scheme, to the character of which attention was directed in a previous number of the *Builder*. The street and road tramway Bills include some half a dozen for the metropolis; two each for Glasgow, Manchester, and Birmingham, with others for Dublin, Leeds, Worcester, Plymouth, Wallasey, and other places. The remainder of the Bills relate to gas and water supply, local improvements, piers and harbours, canal and river navigations, roads and bridges, markets, and miscellaneous. The proportion of the comparatively small number of Bills petitioned for that is to perish in the bud, or to be thrown out upon Standing Orders, remains to be seen.

THE INSTITUTION OF CIVIL ENGINEERS.

THE Report read at the annual general meeting, held December 21st, showed that the actual numbers of the four classes,—honorary members, members, associates, and students,—were 16, 655, 920, and 148 respectively. The ordinary receipts for the past year had amounted to 7,032*l.*, being only 141*l.* less than they were in 1868, notwithstanding the loss of dividends due to the sale of stocks necessary to meet the expenses of the new building. The expenditure in the same period (exclusive of the new building) had been 3,786*l.* During the financial year ending on the 30th of November last, a sum of 8,498*l.* 5s. 6d. was paid on account of the new building and its accessories, making, with the sum of 9,711*l.* 16s. 10d. expended up to the date of the previous annual meeting, a total outlay of 18,210*l.* 2s. 4d. This outlay had been entirely defrayed out of the funds of the Institution, viz., 10,246*l.* 1s. 8d. by the realisation of investments, 2,209*l.* 16s. 2d. from the Locke Gift and Bequest (which have been received too recently to be invested), and the balance, 5,754*l.* 4s. 6d., from the surplus income of the last two years. It should be mentioned that the building fund proper had only contributed 5,712*l.* 5s. 10d. towards this outlay. The remaining balance of 12,497*l.* 16s. 6d. had been obtained from the general funds,—an amount which the building fund fees, on election, would not be able to reimburse for the next quarter of a century. The nominal or par value of the several funds under the charge of the Institution, on the 30th of November last, was,—I., general funds, 7,656*l.* 1s. 8d.; II., trust funds, 12,119*l.* 15s. 8d.; and III., cash balance, 268*l.* 9s. 9d., making a total of 20,044*l.* 7s. 1d., as against 29,835*l.* 18s. two years ago, when they were at a maximum. This showed a decrease in the interval of 9,798*l.* 10s. 11d.; but it was to be remembered, as previously stated, that in that period a sum of 18,210*l.* 2s. 4d. had been paid on account of the new building.

On Tuesday, January 11th, Mr. Vignoles will deliver his address as President.

CONTRACTS FOR ROADMAKING, SEWERAGE, &c.

SIR,—You have been calling attention on several occasions to the great discrepancies between the tenders for works of this kind, and they have certainly become rather notorious: but in justice to those who have sent in tenders for these works, I think it only fair to say that in many cases the plans and specifications are prepared in so vague and indefinite a manner as to account for very great differences in the estimates. In many instances which have come under my own notice, there have been no definite particulars as to the manner in which materials have to be laid down and consolidated, nor as to the quality, thickness, depth of socket, or mode of sighting, jointing, and laying drain-pipes, nor of the method of filling in, ramming, and formation of surface. It is no wonder in all such cases that very serious misapprehensions should occur, and I am often surprised that they are not more frequent.

There is no class of work which requires more strict and definite description than works of street-making and sewerage, as they are almost entirely covered in, and the first errors cannot be detected in time to be remedied by the contractor, even if he should be liable under the terms of his contract.

All works of a permanent character should be carried out in the very best manner, and of the very best materials; and it is simply an expensive economy to execute them in any other way. A liberal price should be given for such works; and the contractors, while they are entitled to have the fullest and most minute details of the work set before them, should also be bound to keep the work, when executed, in perfect repair for six months after completion.

THOMAS D. BARRY, Assoc. I.C.E.

ACCIDENTS.

AT Barking during a gale a large portion of the steeple of the parish church has been blown down. The north-east corner for about 12 ft. down was blown completely off, and fell through the roofs of the nave and north aisle into the church, while the peal of bells in the tower is covered by a portion of the rubbish. The steeple is very old, and has been cracked for some time. The damage amounts to several hundreds of pounds, and the repairs are entrusted to Mr. Scopes, Needham Market.

A portion of the Pier in course of erection at Eastbourne was blown down in a recent gale. The columns and girders for some 60 ft. of the pier had been completed, and 60 ft. beyond this another cluster of columns had been placed, but not connected with the other portion of the pier. The gale was so violent that these columns were torn up; indeed, some were snapped in two, and striking the girders, which had not been planked, hurled some into the sea, while others were bent, and hung over the head of the pier. This mishap will cause a considerable delay in the completion of the pier.

At the Paragon Stables, Paragon-street, Hull, the roof of one of the central stables has fallen in. The stable comprises two rows of stalls, and, fortunately for the horses (sixteen in number), the *débris* fell between the two rows. Thus the horses were all entirely uninjured. But two of the stablemen were found to be missing. One of them was afterwards dug out dead; the other fainted on being extricated. He was conveyed to the Infirmary. The accident was caused by the giving way of a wall which had become weakened during the recent stormy weather.

ZINC ROOFS.

SIR,—Will you or some of your correspondents kindly inform me "the best composition for covering over a zinc roof, which, from expansion and contraction, cracks and admits rain?

I have tried tar and sand, which partially answers, but believe I have read in some of your early issues of a composition which would form a coat of varnish on metal, impervious to rain, incombustible, elastic, inexpensive, and deadening the sound produced by heavy rain or hail-storms.

Any suggestions meeting these requirements will be welcomed by ENGINEER.

THE ST. PETERSBURG EXHIBITION.

SIR,—In answer to the inquiry contained in your paper of December 18, regarding the St. Petersburg Exhibition, I beg to inform you that the Russian Consulate in London has received official notice that the said Exhibition will be a purely national one. There must, therefore, be some mistake in the American statement.

I have lately returned from St. Petersburg, where I have resided for a number of years; and should any of your correspondents desire to be informed as to the economy of the Russian Empire since the introduction of the vast reforms,—reforms which have changed entirely the former aspect of affairs in that country,—I shall be happy to correspond with them. JAMES RUSHFORTH.

CASES UNDER THE BUILDING ACT.

NOTICE TO SURVEYORS.

ADIN SHEFFIELD, of East India Dock-road, Poplar was summoned to the Thames Police-court, Stepney, for having erected a building, two stories in height, intended to be used as offices, at Limehouse Dock, Emmett-street, Poplar, without having given notice to the District Surveyor, as required by the 38th sec. of the Act, the building being irregularly constructed (the same builder having also committed a similar offence in making alterations and additions to another building in the immediate neighbourhood of the above). The case was heard before Mr. Benson on the 18th ult. The defendant did not appear, and was convicted in the penalty of 5*l.* and costs.

David Allen, a small builder (also the owner), of Kirby-street, Poplar, was summoned for having built three houses at Goodliffe-place, Poplar, without giving the required notice. In April, 1868, notice was sent to build four cottages; two were carried up and completed, and the fees paid in the following October, the remaining two being suspended. Early in the present year the builder was especially told that a fresh notice would be required before he commenced the other two houses, when he informed the District Surveyor that it was not his intention to build any more. On the 2nd of December, 1869, the District Surveyor discovered three houses built adjoining the two for which notice had been given in April, 1868. This case was also heard before Mr. Benson, at the Thames Police-court, on the 18th ult., when the defendant was convicted in the penalty of 20s. and costs.

Irregular Building.—At the Clerkenwell Police-court, Mr. Charles S. Thompson, of No. 26, Clifton-road, Hornsey-road, was summoned by Mr. John Turner, the District Surveyor of the Eastern Division of Islington, for having erected at the rear of each of the three houses belonging to him in the Moray-road a building constructed contrary

to the rules of the Metropolitan Building Act,—viz., having walls only half a brick thick, and being covered with wood. Mr. Thompson did not appear. Mr. Cook, the magistrate, having gone into the case, made his order that each of the buildings should be amended, and awarded 22s. as costs.

Also Mr. Richard Huett, the *occupier* of a house situate in the Cambell-road, Seven Sisters-road, was summoned for the fees due to the District Surveyor for surveying the erection of the house he resided in, and which the builder had failed to discharge. The magistrate made his order that Mr. Huett pay the fees and 14s. costs.

THE PROPOSAL FOR WIDENING LONDON STREETS.

SIR,—The illustration to Mr. Taylor's suggestion was only intended to make plain his meaning as to the space gained. The architectural treatment of the buildings would be open to a wide range of choice in colonnade, arcade, &c., in various styles. The least satisfactory plan would be, I think, that proposed by Mr. Forbes. A row of houses supported only under their party walls would be anything but beautiful. With respect to girder construction being made conspicuous, it seems to me that in this or any other case the iron girder is so unmistakably and uncontrollably a thing of utility, it can never be prominently introduced with success in that ornamental art known as architecture.

As the fronts of the houses are already supported by concealed girders, it would be an unnecessary expense putting others. All that would be absolutely required would be the pushing backward the shop-front.

With regard to the objection that a covered way as proposed would result in the nuisance complained of in the case of the Quadrant, Regent-street, I do not think it at all a matter of course. The evil in the Quadrant was owing to its contiguity to the Haymarket slums; and whil t the Haymarket is a *gay* market, the neighbourhood will suffer, columns or no columns. In respect of the shops being darkened: in a similar case, the Rue de Rivoli at Paris, the evil does not appear to be felt, and certainly from furnishing protection from sun and rain, allowing ladies to alight under cover, &c., there would be compensating benefits.

Of course, Mr. Taylor does not pretend his proposition is without drawbacks. He only advocates it as the best way of solving a difficult problem. P. E. MASEY.

ACTION AGAINST AN ARCHITECT FOR ALLEGED NEGLIGENCE.

Andrew Armstrong v. *Alfred Jones.*—This was an action in Court of Exchequer, Dublin, to recover from the defendant, an architect and civil engineer of that city, damages for alleged negligence in preparing plans, specifications, and working drawings for, and in superintending the erection of, a dwelling-house and premises for the plaintiff at Temple-road, Upper Rathmines. The case was at hearing for several days.

Baron Fitzgerald, in the course of his charge to the jury, said that in substance the action was a complaint that the defendant had been guilty of a breach of duty. The defendant was employed by the plaintiff as an architect to prepare plans and specifications, and to superintend the execution of those plans and specifications, for the dwelling-house of the plaintiff. It appeared to him that when the defendant accepted this employment he came immediately under the obligation to exercise, both in the making of the plans and specifications and in the superintendence of the work, reasonable care, diligence, attention, and skill; and if there had been any default on his part in that superintendence, from which actual damage had arisen to the plaintiff, then the defendant was responsible. A very serious question arose upon the contract. It appeared that for the completion of the whole contract Mr. Bolton was to be paid 3,224*l.* 9s. 9d. The mode of payment was to be by instalments, but the right to receive any instalment could only be conferred on Mr. Bolton by the defendant's certificate, given under his hand, certifying that work had been done to the amount of 250*l.* at least. Then he was to be paid seven-eighths of the amount so certified. It was also provided by the contract that none of the certificates should be given unless the work was done to the satisfaction of the defendant, and in conformity with the contract. There was to be a final certificate, however, which would be conclusively binding on both parties—that was on Mr. Bolton and the plaintiff. The allegation of the plaintiff was that the defendant was responsible for want of due care, attention, and caution in the giving of these certificates. That allegation was the subject of the other three counts which they had to consider. The contention of the defendant was, that he was only to be held responsible for an honest and *bond fide* performance of his superintendence, not independent of care and skill. That appeared to him to be a question deserving of much consideration; but for the purpose of determining between the parties in the shortest and most inexpensive mode, he should ask them to treat it as that the defendant was responsible for the want of care, skill, and attention in the performance of his duty. If he was wrong in that he would be set right; but, in the meantime, he would ask them so to treat it. If they found that there had been want of reasonable skill, care, and attention in the superintendence of the works, then would arise the question of what actual damage arose to the plaintiff from this default of the defendant in this duty of superintendence. The measure of damages could not by possibility be what would be necessary to put the work in the condition required by the contract—that would be as against the party who was paid for the performance of the work; but now the damages should be measured as to what loss the plaintiff had suffered by reason of the negligent performance of his duty of superintendence. It appeared six certificates had been given—1st, 27th April, 1867, for 500*l.*; paid 437*l.* 10s. 2nd, 31st December, 1867, 500*l.*; paid 437*l.*10s. 3rd, 1st February, 1868, 500*l.*; paid 434*l.* 10s. 4th, 5th March, 1868, 1,000*l.*: paid 875*l.* 5th, 11th April, 1868, 500*l.*; paid 437*l.* 10s. There were certified in all 3,000*l.*, out of which had been paid 2,265*l.* On the 9th of July, 1868, the sixth certificate was given for 500*l.* on the contract, and 300*l.* for extras, together 800*l.*, out of which the sum payable was 700*l.* Now, as to the giving of the sixth certificate, it was given *ultra vires*, and the plaintiff could have refused to pay it—he was not compelled by the powers of the contract to pay it. It would be almost impossible to say that the giving of the certificate was not a gross want of caution, and very negligent, to say the least of it. Now, the plea of the defendant was that this certificate was given by the leave of the plaintiff. It was a question whether this plea ought to have been allowed, but for the purposes of the present trial it was not necessary to consider it. It would be impossible to say that he did not pay this with full knowledge that 2,625*l.* had been already paid, and he or his attorney had the actual possession of the draught of the contract by which he was apprised that he was not compelled to pay, and yet he (Mr. Armstrong) made no complaint until February, 1869. He had now gone through the questions they had to try, and as they were as familiar with the evidence as he was, it was unnecessary for him to review it. His lordship then left the following questions to the jury—1st. Were the houses and premises at Temple-road in any respect built of inferior or insufficient materials, or erected in an unskilful or unworkmanlike manner, or permanently injured or diminished in value, or were any deviations or omissions from the plans and specifications made. 2nd. Were they, or any of them, made or done by the authority or permission, or by reason of want of reasonable skill, care, and attention of the defendant in his superintendence of the works. 3rd. The damage arising to the plaintiff from such default of the plaintiff in said superintendence. 4th. Whether the certificates, or any of them, were given to the builder in respect of works which were not done to the satisfaction of the defendant, or according to the contract. 5th. Whether the certificates, or any of them, were given to the builder without taking into consideration deviations and omissions made by the builder in the work, and without making any deductions in respect thereof from the unit mentioned in such certificate or certificates. 6th. Whether the giving of such certificate was by reason of the negligence and want of caution of the defendant in his duty of superintending the works. 7th. The damage thence arising. 8th. Whether the 6th certificate was given through negligence and want of due caution on the part of the defendant in superintending the work. 9th. Whether the plaintiff, with full means of knowing the default of said 6th certificate, acquiesced in and adopted the same.

The jury, after an absence of an hour and a half, returned, handed in a verdict, with an answer in the affirmative to each question, and assessing the damages on the 2nd and 3rd questions at 75*l.*, and on the 5th, 6th, and 7th questions at 5*l.*, with 6d. costs.

CAB MEN AND CAB STANDS.

IT appears to me that these hardly-used men might be kept out of the public-houses, if a small kitchen,—wooden houses on wheels,—were attached to each cab-rank; tea and coffee might then take the place of gin and brandy, and cost less. SPERO MELIORA.

CONCRETE BUILDINGS AND THE "INCLOSURE COMMISSION."

IN assenting to the grant of public money for the erection of farm buildings and labourers' cottages, the Inclosure Commissioners rightly feeling the importance of obtaining durable buildings for the heirs on whom the rent-charge would fall, have heretofore not considered themselves in a position to recognise concrete as a suitable building material. It may be of consequence to some of our readers to know that they have just now accepted as satisfactory a number of farm buildings, on a large estate, in Wiltshire, on the report of Mr. Godwin, whom they had directed to inquire into the subject, and who has also, at their request, reported on the general principle, and on such precautions as should be taken in dealing with future applications for leave to erect buildings of this nature. Great advantage would follow lessening the cost of healthful cottages, and we look on the use of proper concrete as likely in many districts, and under proper regulations, to effect this. The commissioners, by the step they have taken, show an enlightened willingness to go with the age.

THE DEAN OF GUILD COURT.

FALL OF A RAILWAY STATION AT EDINBURGH.

SIR,—Will you have the goodness to give a place in the first number of the *Builder* to this communication, which is intended to be an answer to a letter which appeared in the *Builder* of December 18, regarding the fall of a part of the Caledonian Railway Shed here, and in which the writer states this:—

"In my opinion the whole responsibility and the entire odium of the matter properly belong to a wretched remnant of municipal antiquity we have in Edinburgh which goes under the name of the Dean of Guild Court."

It will be sufficient to say that the jurisdiction of the Dean of Guild Court does not extend unfortunately to that part of the city in which the building is placed, and it has no control whatever on the buildings erected therein; its supervision extends over the ancient and extended royalty, the Canongate and Portsburgh only, and the Court can, therefore, be no more held responsible for the fall of the building in question than they could be for the fall of Babylon.

In a previous paragraph the writer narrates his belief to be,—

"That the cause of the accident was due neither to the iron castings which gave way, nor to the timber-work of the superstructure, but to the deplorably unsatisfactory character of the foundation. The whole thing is built, not upon sand, but upon genuine and unmistakable rubbish."

Now, if that was the conclusion he arrived at, he was bound to lay the blame—if blame there was—on the architect or engineer in charge; but he, prudently it may be, or for want of courage, does not do so, but goes out of his way to lay it on an institution of whose powers he appears to be ignorant.

Allow me to tell you something concerning the constitution of the Dean of Guild Court, as it will afford observers the assurance that the cheesemonger element, by which, from his readiness to entertain the idea, it is presumable he is pained, by a hereditary or more intimate taint, does not form any of its composition. It consists at present of the dean, who has been connected with plans and buildings for forty years; three trader councillors, builders, who are at the head of their profession in Edinburgh; two merchant councillors, one of them recently the chairman of the Chamber of Commerce, and the other a merchant; and one a writer to the signet,—seven in all. These members act gratuitously; they have no salary or fees; then there are two advocates, senior and junior assessors, who have salaries, and who sit in the court when legal points arise; but such points are rather of rare occurrence. Now, a court so constituted has evidently within itself the kind of knowledge which is required for dealing with the matters that come before it, and it has been found both useful and effective, and would have been more so, if its powers were more ample than they are. It has now subsisted for more than four centuries, and it must have had much that was good and necessary in it; and were it superseded,—say, by handing the jurisdiction to the sheriff,—he will, in nine cases out of ten, have to call in experts,—perhaps the very men who act gratuitously now,—to assist him and report, and he and they will be paid handsomely, and the suitors will be involved in correspondingly large expenses.

ONE WHO KNOWS.

GREY HAIR IS NO ECLIPSE.

SIR,—Allow me to say a few words in behalf of our greyhaired artisans. There seems to be with a large section of employers of the present day a somewhat unaccountable aversion to them, an aversion that deserves censure.

Apart from the philanthropy of the subject, we deem it a duty to defend the fair fame, and to uphold the rights that belong to the aged; but more particularly so when the class affected has so strong a claim to advance in its favour as that of being the recorder of the architectural and engineering genius of the present century.

That the artisan should be despised for his locks having silvered with the years that gave him experience, and perfected him in the peculiarities of his art, appears rather anomalous, when we consider that in nearly all other professions the hoar of time is of itself an essential recommendation.

Often have we seen the young aspirant, with the theories of a hundred brains floating in his head, fall to zero when required to give those theories a practical turn; and often have we seen the unassuming veteran perform the most difficult undertakings with an ease and perfection that can only be acquired by lengthened experience. As a rule, the experience of the aged craftsman fully compensates for any defects in his movements; and his periodical returns of accomplished labour will hold no inferior place, when viewed beside the corresponding productions of his more youthful shopmates.

A CRAFTSMAN.

THE BLOCKADE OF FLEET-STREET.

INCOME OF THE MIDDLE TEMPLE.

SIR,—The congestion of Fleet-street continues, nay, increases, and the dangers of the middle passage are worse than ever. Nothing but a new street will ease the traffic. Now, it appears to me that the simplest and cheapest plan would be to make a broad, straight street from the foot of Blackfriars Bridge, through the Temple, to St. Clement's Church. This would relieve Fleet-street of all the traffic going westward from the bridge, and would be a shorter line than at present. As to the expense, it would be comparatively trifling, as the houses in Whitefriars

are of a very inferior class, and, as to the Temple, the land, in fact, belongs to the nation, the Society of the Temple paying an insignificant sum of 20*l.*, or something like it, as quit rent to Government; while the rental received by the benchers for chambers is something enormous,—amounting, according to the best information I can obtain, to about 13,000*l.* a year for the Middle Temple alone. For the sort of residences provided for the members of the Inn, let any one go and see the miserable dog-holes where they locate, and judge for himself. Besides this, every barrister called is a clear profit of 100*l.* to the society. What becomes of all the money? is a question that has often been asked and never answered; but we all know that when trustees receive large sums of money and do not account, imputations are not wanting. The whole thing is one of those vast corporation abuses of by-gone times, which the ensuing Parliament must inquire into and reform. The immense sums now received from members were never intended to be squandered away in sumptuous feasts to illustrious strangers and the private friends of the benchers. RICHARD PATERNOSTER.

COMPETITIONS.

Madeley Union (*Shropshire*).—The Board of Guardians for this Union recently invited competition designs for a new workhouse, to accomodate 210 inmates, from nine architects having experience in the subject. The drawings were sent in under motto, on the 1st December, and on Friday, the 17th ult., the building committee selected the design designated "Idoneum," and elected its authors, the Messrs. Hadden, of Hereford and Great Malvern, "as architects for carrying out the proposed new workhouse."

FROM SCOTLAND.

Aberdeen.—An accident has happened at Ferryhill, Aberdeen, by which seven men were injured, three of them very seriously. It appears that while a number of masons and labourers were employed with a contractor named Milne for the construction of an ice-house for Mr. Garron, Ferryhill, some of the supporting beams gave way without warning, and the building, which was just being completed, fell with a great crash. The ice-house was about 30 ft. high. The roof was all but flat, and the men injured fell, along with the roof, to the ground, and were more or less buried among the rubbish. They were extricated with all possible speed. The injuries of some of them were of a dangerous nature, but one received only very slight bruises. Another serious accident has since occurred at Torry, near the city. For the purpose of lifting the concrete blocks to be used in the new south breakwater, at the harbour, which is about to be constructed a little to the north of Girdleness Lighthouse, a travelling crane had to be erected. The contractors for the erection of this crane were Messrs. James Harvey, jun., & Co., engineers. With a weight of 17 tons the strength of the crane was tested by the contractors, and no symptoms of weakness, it is said, presented themselves. A similar test was going on, when one of the cross-beams supporting the platform on which the crane was erected gave way, and the machinery, accompanied by six men, who were employed on the platform testing the crane, were precipitated from a height of from 25 ft. to 30 ft. A member of the firm escaped without injury, and one of the unfortunate six men who fell among the *débris* received only a slight wound on the side of the head. The others were all more or less seriously injured.

Elgin.—When the side windows of the parish church of Elgin were filled with ornamental glass in summer, four memorial windows for the east end of the building were not ready. They have now reached Elgin, and two of them have been put into their places. The ornamentation of the whole is Classical, in harmony with the style of the church, which is of Greek architecture. The ground-work is grizaille. The grounds of the bordering and leading forms are deep ruby, and blue; and the ornaments and labels, with inscriptions, are relieved in light tints of gold and white, turned up with light green, purple, &c. The glass is rough, and crystalline in texture. The two upper windows are in memory of General Alves, a distinguished soldier, who was much attached to his native town of Elgin, and who left a sum of money to erect a memorial of himself in the parish church.

Dundee.—A Unitarian church and schools are being erected at Constitution-road, from the designs of Mr. Alexander Johnston, of this town, architect.

Caputh.—The parishioners of the parish of Caputh, to perpetuate the memory of their late minister, the Rev. R. H. Scott, have erected over his grave in their burying-ground a monument of Aberdeen granite. The complete monument is 9 ft. 4 in. high, and consists of a carved cross. The die contains, within the outlines of a shield, the simple inscription. The monument was executed from an original design by Mr. Hutcheon, of Aberdeen.

Books Received.

Papers read before the Associated Arts' Institute. AN interesting *brochure*, consisting of papers read during the past session, 1868 9, by Messrs. R. Westmacott, Soden Smith, R. Redgrave, H. Ellis Woodbridge, W. Cave Thomas, Montgomerie Ranking, and Lemon H. Michael. It is edited by Mr. F. Scarlett Potter, who acts as secretary of the Institute. On the 9th, a paper "On the Cultivation of Artistic Feeling," is to be read by Mr. H. E. Woodbridge.

Midsummer Eve: a Fairy Tale of Loving and Being Loved. By Mrs. S. C. HALL. Hotten, Piccadilly. 1870.

MR. HOTTEN has published a beautiful edition of Mrs. S. C. Hall's charming "Midsummer Eve." It is illustrated with no fewer than 200 engravings from drawings made by Maclise, Stanfield, E. M. Ward, Elmore, Frost, Noel Paton, Hulme, Goodall, Thos. Landseer, Creswick (now, we regret to say, no more), and other well-known eminent artists. The story is one of the most elegant and fanciful that its admirable author has written, full of human sympathy and wholesome teaching. It would be a good thing if the hanging-committee for each year at the Royal Academy could be made to read its closing chapters. It is a beautiful gift-book, and can scarcely fail to be long regarded as such. The volume is dedicated to the author's old friends, Sir Thos. Duffus Hardy and Lady Hardy, whose recent elevation in social position gratifies all who know them, and can appreciate worth and talent.

VARIORUM.

IT is of very little use just now, with hard frost dominant, to say that tourists will find "Bemrose's Guide to Derbyshire, a complete Handbook for the County," a very good one. Still, as the publishers now send it out, we will not withhold that opinion. The editors of it, Mr. J. Hicklin and Mr. Alfred Wallis, have evidently taken much pains, and have made it more than an ephemeral companion. It includes a number of very good illustrations.——Sprague's "Diary, with Tables for Architects, Surveyors, and Builders," is a capital little pocket-book for its purpose. We do not pretend to have checked the correctness of the tables and calculations. A list of the District Surveyors, under the Metropolitan Building Act, has been added.——"The City Diary and Almanack" (W. H. & L. Collingridge) contains, in addition to the matter ordinarily given in a diary for the desk, a large mass of official information with regard to the City, not to be found in any other publication. It is a complete guide to the various business offices of the Corporation and City generally. There is ample space for daily entries, upon good paper.

Miscellanea.

Commencement of the Sittingbourne Water-works.—The great depression in the brickmaking trade in this neighbourhood has thrown a large number of labourers out of employment, and produced great distress and want. To alleviate this to some extent, the local sanitary committee have urged on their arrangements, and obtained the authority and sanction of the Secretary of State to go on with the work, as also to borrow a sum not exceeding 5,000*l.* to defray the cost. There are now upwards of 100 able-bodied persons in receipt of relief from the public rates, amounting to about 8*l.* per day, which, it is hoped, will now be utilised to the ratepayers by the commencement of this work, which will be carried out under the superintendence of Messrs. Easton, Amos, & Anderson.

Architectural Society of Northampton. The ordinary meeting of the committee was held on the 13th ult., the Rev. Lord Alwyne Compton in the chair. A sub-committee was appointed to advise upon the best manner of laying out any money which may be contributed towards the restoration of Earl's Barton Church,—a desire having been expressed that the Architectural Society will undertake the supervision of the work. The chairman stated that a meeting of the committee for the restoration of St. Sepulchre's Church had been held, when it appeared, from the report prepared by the secretary and treasurer, that, assuming the correctness of the estimated expense, it will be possible to complete the works, and to clear off all the debt on the former work, by an expenditure beyond what is already promised in the way of subscriptions, of about 700*l.* The debt for which the members of the original committee are responsible is about 1,000*l.* The committee, therefore, determined to obtain tenders for the work, as they feel that the subscriptions already announced are not likely to increase till the committee commence some part of the work. The report of the sub-committee on the plans by Mr. Slater, for the restoration of the churches of Bozeat and Strixton, was read and adopted.

The American Railroad Style for India. A small item of news from India, remarks *Chambers's Journal*, has occasioned some sensation in the engineering world. The Governor-general, Lord Mayo, has sent to the United States for an engineer accustomed to the rough-and-ready way of constructing railways in that country, and at a cost far below that which an English engineer would consider possible. India is yet in want of thousands of miles of railway; and if, by Lord Mayo's experiment, they can be made cheaply, the benefit will be great to all concerned, including English engineers, who may perhaps learn a useful lesson therefrom, and lay down cheap railways in Australia. By the way, Australia has offered to supply the Indian government with all the horses required for their army at 25*l.* apiece.

Mechanical Puddling.—Messrs. Witham, of Leeds, appear to have devised a mode of mechanical puddling by which all the really heavy work is done by the aid of mechanical appliances. The new furnaces, too, work with about 13 cwt. of coals, compared with 20 cwt. for the same kind of work in the best-constructed furnaces of the common description. Each of the patent furnaces is worked by two men, opposite each other; but by means of the mechanical arrangements at the top the men are enabled to move their rabbles into all parts of the furnace, with comparatively little trouble, and with nothing like the ordinary amount of manual labour. The *Iron Review* says that a considerable number of these furnaces will be erected before long in the North of England.

The Consumption of Gas.—It is commonly supposed that the amount of illumination obtained from gas is in exact proportion to the quantity of gas consumed. The investigations of Professor Silliman, of New York, however, go to show that the amount of illumination is increased far more in proportion to the gas expended, as it increases according to the square of the volume of gas. Thus, if twice the quantity of gas be burned, the illumination ought to be improved fourfold. If three times the quantity of gas be used, the illumination ought to be nine times better. Professor Silliman is, we believe, the sole authority as yet for these conclusions; but he has a high reputation in science, and no doubt his experiments will be rigidly tested.—*Daily News.*

Discovery of Ancient Greek Liquid Measures.—An interesting and important archæological discovery has been made at Gythio, in Lacedemonia, consisting of a cube-fashioned stone, with five conic apertures, corresponding to the five well-known liquid Greek measures, of which hitherto all but the respective volume was known. To remove every doubt, the margin of each is inscribed with the corresponding designation.

Gas Explosions.—Two alarming gas explosions have just occurred, one at Great Yarmouth, and the other at Bury. The explosion at the former place completely destroyed a large steam ropery, and severely injured three of the workmen. It was caused by leakage of gas and incautious use of a candle. Two men were also considerably burnt by the explosion at Bury.

The Builder.

VOL. XXVIII.—No. 1405.

Gleanings in Glastonbury.

WHO shall profess to glean at Glastonbury, where harvest-men have preceded who are not wont to bind up sheaves carelessly? Yet, it is not easy to leave the site without putting pen to paper to record impressions that must always remain dear to a lover of architecture who visits it for the first time. The town is now reached easily from London in some five hours of continuous travelling, except by those whom a passion for an express train on the main line betrays into an interval of three hours' waiting at the change at Temple Combe. The face of the country, however, perfectly explains how our pilgrim forefathers could only reach the place by foot or on horseback; and how, still earlier, it had all but the complete peculiarities of an island. The eminences that cluster about the most conspicuous peak of the Tor rise out of level plains extending seawards, that, rich with pasture above, have peat below cut constantly to a depth of 10 ft.,—as once out of the waters of the Bristol Channel. The cultivator over this characteristic district seems as interested and occupied with water as with land. Embankments, cuttings, pumps, control the ever-present element; the decoy duck has still a place for its function here, and a visitor of even a week may have more than one chance of seeing a crane in a state of nature. In the flatness, extent, and verdure of the district, with its filmy horizon of the Mendip hills, an artist pleases himself with tracing a resemblance to the Campagna of Rome, and recognises representatives of the Alban range, and a miniature of his beloved Soracte. As the railway passes on over the turf country, the permanent way assumes a type of very qualified permanence; and the mounded ballast tells of how much more solid material is expected to be absorbed by the foundation.

It was this same gulf that, we are assured, absorbed in its insatiable maw all that is not still left scantily standing of the great Abbey Church of Glastonbury,—to form a road to Wells across the marshes. The site of the Abbey, however, and its dependencies, was always high and dry, unassailable by incursions of the sea that have sometimes even reached its precincts; well presented to the warmth and light of the sun; and half encircled by hills, of which the slopes of old, as now, were abloom with apple orchards, that provide the cider most dear to natives, but, oh, how hard to palate of unaccustomed visitor!

There is very much interest and very much beauty in what still remains of the Abbey, but it is the older and more completely preserved chapel of St. Joseph, so called with a persistency there is no contending against, that we recognise a really classical example of a style at its perfection. It may be fairly said that when Norman architecture had achieved this work, there was no further essential and elementary development required from it. It was equal to the responsibilities of structures,—of cathedrals,—of the greatest extent and importance, and had reached a point of elaboration and finish that could only announce a dead pause or a distinct and direct transformation. Resources of construction and ornament are employed with a variety and consistency that constitute definite style, and are of a quality that pertains to a very high style indeed.

The style of this chapel is usually designated Advanced Transition, a title which may mean anything, and therefore really defines nothing. There are few terms more infested by equivocal implications than the term Transitional, and never is it more so than when pressed into service, as we shall see, in such a case as the present.

The rebuilding of the structure of which we have the beautiful remains is recorded under year 1184, as taking place on the site "where from the beginning the *vetusta ecclesia* had stood." The restricted area seems to imply that the reconstruction was scarcely extended beyond the originally consecrated ground; the very title *vetusta ecclesia* proves—implies, at least—that there was a more modern church near it which may well have been more extensive. We have a trace of this in a notice in the Saxon Chronicle of an affray between the monks and the first Norman abbot, Thurstan. The disturbance, which seems to have turned upon a proposed supersession of the accustomed chant, commenced in "the chapter-house." Armed laymen were introduced, and the monks fled into the choir and locked the doors. There they were assaulted by "the knights" or the "Frenchmen," who gained the upper story—probably a triforium—and shot arrows at them as they clung to the altar, while others burst the doors. Three monks were slain and eighteen wounded. The site of this church is now probably occupied by what remains of the Early English Abbey Church, of which at a later date the western end was united by an intermediate structure to the Chapel of the Virgin or St. Joseph. The east wall of the chapel was then broken away, and steps were inserted leading up from its lower level to the larger church.

The plan of the chapel, as originally independent, measured on the exterior along the line of full projection of turrets and buttresses, appears to have been comprised pretty accurately in an oblong of 40 ft. by 70 ft. By deduction made of thickness of walls and buttresses on either side, the interior width is diminished to 23 ft., and length to 53 ft. or thereabouts. The smallness of the scale of the best plan available makes it scarcely worth while to attempt absolute exactness. The plan of the interior is probably a double square of 25 ft. broad in the clear, diminished by the projections of the vaulting shafts in front of the wall.

The interior was divided into four severies, vaulted quadripartite, and effectively equal, the chord of the diagonal groins measuring 25 ft., or just double the breadth of the severy. The diagonal ribs,—it can be accurately made out,—were semicircles; they sprang from triplet shafts, of which the abacuses ranged with a string-course at 15 ft. above the pavement of the chapel, which ran level with the window-cills, and just above a blank arcade against the lower division of the wall. The curves may possibly have been slightly stilted; but the full height from the pavement to the intersection of the groins probably could not have exceeded 31 ft. or 32 ft.

The window, including its mouldings, was made just equal in height to the wall below the string-course, including the bench-table that bears the bases of the shafts.

The windows occupy the centres of the severies, and centre truly with the four divisions of the wall below; the second of these, from the west on either side, is occupied by a doorway, but agrees in width with the others, where the intermediate wall above the bench-table shows a range of shallow hollowings of channels, against which once stood the range or shafts of the blank but enriched arcade.

The wall on the exterior receives similar decoration, but the fourfold division is made by buttresses, or flat pilasters, instead of grouped vaulting shafts; and here there occurs a source of difficulty, or, at least, an anomaly of arrangement, that cannot be said after all to have been quite satisfactorily dealt with. The natural treatment would seem to demand that a buttress should be placed exactly intermediate between the windows, and so answering to the axis of the vaulting shaft within. But it was manifestly felt to be important to preserve the divisions of the string-course, and the spacings of the blank arcade, the shafts and arches of which divide the intervals very accurately, pretty nearly uniform; and such an arrangement of buttresses would leave the two end divisions of excessive width, as their end margins escape reduction by a buttress, or its equivalent,—the angle turret scarcely advancing beyond the line of thickness of the end wall. The architect, therefore, who did not care to modify his turrets would seem driven to place only his central buttress truly on the line of a vaulting shaft, and disregarding the correspondence in respect of the two others, to set them on either side exactly intermediately between the central buttress and angle of turret. But this would only introduce another difficulty; as regards the windows, there would be a no less serious asymmetry, as only the two central would have a buttress exactly intermediate,—the interfenestral spaces of the other two being very unequally divided,—the buttress in each case hugging them inconveniently on one side, out of consideration to the wider vacancy on the other. Accordingly, on a general view, while the arcades appear spaced uniformly—shafts coming ever neatly and precisely by the angles of the buttresses, the mouldings of the extreme windows east and west are manifestly approached much more closely by the adjacent buttresses than are the two other windows by the centre.

Surely the result as regards the ordination of the architecture above the string-course, whether it resulted by this procedure or not, is neither comfortable nor successful. The buttresses are manifestly displaced—we must apprehend misplaced; and it seems very strange, indeed, that in a building of such careful and refined finish, some struggle was not made to remedy such an irregularity, or qualify its worst unhandsomeness.

On closer scrutiny we find that the disarrangement was not left quite without check, and if the shock to the architectural sense was not quite saved, a symmetry was managed at least at the point where it was most effective, and where it was indeed thought worth compassing, even at the expense of still further displacements.

The enriched doorway is set as nearly as may be centrically, below the second window; the apex of the gable marks the position exactly, and the buttresses to right and left of it come thus symmetrically with both the door and the window above it. The effect is necessarily to push the central buttress unceremoniously out of the centre, and unduly eastward; and, as a further consequence, the most eastern buttress, which has now to divide equally the remaining space, is pressed so closely upon the last window that the light is, in fact, pierced unsymmetrically with the enclosing mouldings within. Hence, as it appears to us, the true origin of the irregularity that Professor Willis adverts to in these erms:—"The section shows that the windows

with one exception are placed in the centre of the interior severies. The easternmost window M. has its ornamental inner arch (*escoinson arch*, as it is termed) in the centre of the compartment, but minor inaccuracies in setting out the plan, which it would occupy too much space to explain fully, have forced the centre of the arch so near the buttress that the window light is pierced considerably to the east of that centre to enable it to be freed from the buttress."

If our view is correct, the displacement did not arise from *inaccuracies*,—in the sense of errors or carelessnesses,—but rather from a studious attention to secure accuracy in the symmetry of the blind arcades that was held of more importance than the deviation of the window light. Neither did this disturbance act by forcing the centre of the window arch towards the buttress,—it was the aggressive buttress, on the other hand, that encroached upon the window arch. Our analysis, indeed, runs counter in result to the whole theory of the Professor as to the cause of that conspicuous divarication, that strikes the spectator at once, between the spacing of the buttresses and the intermediate windows. By this theory it is traced to the circumstance that when internal severies are equal, and the windows exactly intermediate, the space between the window at either end externally and the inner line of transverse wall, being equal to the extent from the other side of the window to the centre of a buttress, the flush wall space on either side of the window becomes of necessity unequal, and the two intervals between buttress and buttress are necessarily less than the interval from each last buttress to the projection of the angle turret that rules with the line of end wall. The theory proceeds that it was to remedy this inequality that the buttresses were spaced without regard either to true opposition to the vaulting system within, or to division of the window spacing without.

This theory, however, as we have seen, does not in any way explain the displacement of the midmost of the three buttresses, nor how it comes that the easternmost window is so unfairly pressed upon, as compared with its fellow in corresponding position westward.

To set down these discrepancies to unexplained inaccuracies in "setting out" is very unsatisfactory in the case of a building which is so remarkable for the accuracy of its plan and execution,—in which not merely the ashlar is worthy of the best Early English masons, but the most intricate mouldings are executed and combined with such, not merely workmanlike, but scrupulous respect for accuracy in dimension. It is difficult to ascribe to such handicraftsmen as we are concerned with here, to call them no more, such inconsequential slovenliness as commencing from the west and pushing each buttress eastward, in order to relieve the inequality of the terminal wall space, at the expense of throwing out all other symmetries, and at last to be taken by surprise by finding that the accumulated differences threatened, so soon as at the third step, to throw the last buttress over the window mouldings.

Still, if we acquit the architects of this last carelessness, they have quite enough to answer for in not grappling more effectually with a difficulty that it is useless to deny introduces, as they have treated it, a disfiguring unhandsomeness, unworthy of the general refinement and dignity of the composition. "Order is architecture's first law," and if it ever is departed from of necessity, it is bound to reassert its claims by imposing every possible respect for whatever qualifications of the trespass may be available. The most wonderful example of subtlety and success in this architectural "temperament," to borrow an analogy from the management of a corresponding difficulty in music, is, beyond doubt, the distribution of the irregularity in the Doric entablature, as it is effected in the Parthenon. This is not the occasion to set forth in detail the resources of proportional variation, by which the closer columniation by the angles, and the axial divergence of angle column and corner triglyph, were made to introduce ease and relief rather than embarrassment; the result must be left to speak for itself, which it does as satisfactorily as the result of less able treatment at Glastonbury of a not dissimilar problem, evokes protests and discomfort. A better sense was not without a certain influence; the architectural conscience is respected very welcomely in the spacing of door and flanking buttresses relatively to the window above it, and most happily in the visible correspondence of the several sets of shafts of the blank arcades in the number and nice adjustment to their intervals; but it would be absurd to palliate the discord that offends us so soon as the eye rises above the string-course, and recognises too distressingly the revolting disarray of members and features that all analogy requires to move in well-concerted sequence.

The remedy—we are scarcely called upon, however, to discuss it—lay between a modification of the angle turrets, and of the treatment of the doorway relatively to its flanking buttresses.

We shall carry on the subject in another article.

A BARK AT BARKING.

"BLESSED are those who expect nothing" (quoted O'Connell once, in answer to the taunts of the Whigs), "for they will never be disappointed." We do not know well what the inhabitants of the town of Barking expect. They seem to be resting on their oars at the mouth of their immemorial creek, trusting that Providence will send them money or business, and somewhat indifferent whether, as a preliminary to health, cleanliness will become the new order of the day.

We went to Barking on Saturday, the 18th of December, a day well suited by its meteorological appearance for developing the unsanitary raciness of Barking, and exhibiting it in full relief. Well, let us state in the pages of the *Builder*,—and we do so from careful personal observation,—that the town of Barking is in a most deplorable state of sanitary destitution. That a town so situated, so near to a great river, and quite within an hour's reach of London, should be the seething and abominable cesspool that it is, is most extraordinary; and yet not extraordinary, when we look into and examine all the surroundings.

The town rises from a level swamp, or little better; no portion presents the appearance of being an inch higher in any one point of the compass, nor does the town seem to have ever been laid out with any design, though one portion of it, which forms an angular confluence of streets, is termed the Broadway. This Broadway, as it is called, is about the central eyelet or focus of Barking; but the extra widening of the thoroughfare here only serves to exhibit more fully the shattered frame and broken-down constitution of the town. Roofless houses here and there heighten the picture, and the most populous street would appear to lack in picturesqueness of character, if no untenanted,—at least, if not a tumble-down,—structure were observable. Scattered through the town are a few of the old timber-fronted dwellings, with the usual coating of lath and plaster, the end of the beams forming the corbels, on which the projecting upper stories rest.

The old red tile covering and red brick features observable in the Queen Anne structures of our cities may be sparely seen here and there, but the old street architecture of Barking possesses little at the present day worth recording.

Now for its sanitary state; though indeed we do not know well where to begin. Entering Leybey's-alley, we waded through a little sea of muck, and it required the utmost caution on our part in steering our course round pools of rain-pour and house refuse. Many of the houses in this alley are in a most ruinous condition, and the privies, some of which have to serve half a dozen of dwellings, are in an indescribable and abominable state. The seats and floors of some of them are scarcely able to bear the weight of a full-grown person,—they are in such a rotten condition owing to the accumulations of filth which lie underneath them. Some of these receptacles, we have been informed, are cleaned perhaps once in six months, or, as a constable told us, even once in twelve months.

In Barrack-lane the sanitary state of the dwellings and the accumulation of filth are quite as bad. Pools of water, ashes, night-soil, choked-up sinks, or no sinks at all! We entered the houses of not a few of the unlucky dwellers, and, indeed, to speak with truth, many of the poor people evidenced and showed a desire to keep their dwellings clean, but their best efforts in places are almost rendered nugatory by the fact that the very offal and scavenging of their rooms and kitchens are thrown out before their doors, to lie there till levelled by foot traffic into the usual roadway. The contents of night buckets, washing-tubs, and charing vessels, all are emptied out in the lane, before the doorways, and drain themselves wherever they list.

Would it be any wonder if deaths by the score took place in these fever-dens and plague-spots?

In a spot called Wellington-buildings, the sanitary condition presented is not better; in fact, in some points it is much worse. For here and in Suffolk-place beside, there is no attempt at drainage or sewerage to be seen. These lanes are situated off Axe-street, and the houses in them are inhabited by poor people, whose source of living is chiefly derivable from their employment in the jute and sacking manufactory. Some of the very poor pay at the rate of 2s. 6d. for their dwellings of two small rooms, and perhaps a kitchen. How a man earning but 10s., or from 10s. to 14s., can support himself and wife and children on this pittance, seems a miracle. We fear that *they do not live*—they only vegetate. The women sometimes work also in the factory, and the children too, if old enough. Poverty is pictured in the faces of these poor people; and, wretched as is their lot, their life would have its compensating clause if health and cleanliness could be guaranteed to them to some extent by local management on the part of the well-to-do landocracy of the town. In Suffolk-place, before the doors of the dwellings, a channel in the unpaved earth was scuffled about an inch or two deep. This improvised sort of Barking drainage was carried for about thirty yards in a line with the front of the houses, having its outfall in a pit of a few feet deep in a kitchen garden at the end of the lane. A very handy method, the reader will say, for the utilisation of the sewage for market gardening purposes.

In this quarter (Axe-street) we spoke to some comfortable people, who expressed a willingness to pay towards the drainage of the town, if some one in authority would begin. One man who rented a house and extensive yard, in which the dung-heap was the most striking object of beauty and value, told us that he got no encouragement to improve on his own premises. His lady-landlord was over eighty years of age. She, poor thing, was thinking now of another world—different from Barking; and, of course, her intended legatees, who were on the "look-out" for a "windfall," did not care a rap for the drainage of Barking. Our Axe-street tenant was a tenant-at-will, and he did not care, like other tenants who professed similar views, to improve other people's property, and be liable to be turned out at a month's notice.

The outfall of the town sewage finds one, and one only, opening into the Creek at the Town Quay, at the end of Heath-street. Into this basin the weighty body of Barking's filth and feculency oozes, saving the not inconsiderable portion that sinks into the soil, and becomes permanently embodied in the earth as a subsoil or sub-fever stratum for the generation of future plague or cholera. Who will gainsay it? The refuse finds a ready market among the market-gardeners and surrounding farmers; but how much, and to what extent, is not the soil of the town and the earth underneath the dwellings of the inhabitants impregnated with foul poison from the want of a system of sewage? It can be easily surmised by rational men, who have some concern about their own lives, the danger that exists here amidst the fearful state of things pregnant with death to themselves and others.

But is there not a sanitary inspector in the town? Well, we asked this question in Barking ourselves, and on reiterating the question again and again, we found out that there was an officer bearing some approach to that appellation, who received the magnificent salary of 20*l.* a year. Who appointed him we do not know. There is, indeed, a police-barrack, containing a controlling sergeant and a few subs. under his direction; but this is the sum-total of governmental and sanitary "law and order" system in Barking.

The water-supply of the town is very insufficient, and a great deal of it is supplied from wells in the distance, brought in by water-carriers, and supplied according to the demand. Some of the pumps which supply a portion of the poorer inhabitants with water, which is evidently used for drinking and cooking purposes, are in close proximity to privies. In one or two instances we found a pump which supplied a whole line of houses, back up right against a privy-wall, the cesspool clearly and unmistakably draining its foul poison into the well-hole of the pump. It is a marvel and a mystery to us that there are not more deaths in the town from its sanitary condition; but we

must suppose, sometimes, and in some cases, Nature takes its revenge by contraries, and that, as habit is a second nature with some folk, the people of Barking, like the bees, can extract honey and health from swamps and seething cesspools.

There is, however, amid and above all that is discouraging and disheartening in and around Barking, one little oasis. It is a cheerful, although a grave spot. It is the old church and churchyard of the town. The old church of Barking contains much to interest the visitor or wayfarer. The weather-beaten tower that rises above the more modern-body church, but to which it is still a component part, tells of old feudal days and famous men. The tower contains a very good peal of eight bells and a clock, which, from an inscription within the works dated 1822, shows that it was repaired by the generosity of one of the parishioners. The old peal, which hangs in a state of semi-darkness, is mounted between an oak framing; the wheels through which the ropes play being of the old wood pattern. Yet the bells have lasted long, and acted their part well.

The church possesses some interesting monuments and tablets *in memoriam* of natives or residents of Barking in days gone by. A few of these monuments to the dead are very well executed pieces of sculpture; and, considering the age of some, we were somewhat surprised to find in a local church such good evidences of the sculptor's skill in England. Some of the tablets, though they relate to persons who are upwards of two or three centuries dead, were evidently not erected to their memory until many years after. The absence of a date on some renders it difficult for the mere passing visitor to affix the exact date.

In the chancel side-wall there is a very finely executed tablet, with bust and symbolical representations, to the memory of a Captain John Bennett (a ship captain) and his wife, a native of Poole, in Dorsetshire. A very superior part representation of a ship stands out in relief, with prow, bulwark, deck, masts, ladders, and cordage. Underneath, several nautical instruments and other appendages to the art of navigation are grouped or scattered. No sculptor's name appears, but the date to which the monument relates is 1636.

In front of the altar, without the rails, are several flat slabs, with Latin and Old English inscriptions. Some few of these yet retain their ancient monumental brasses; others are despoiled of them. You will hear from the civil custodian clerk here in the church of Barking, what we have heard in sundry and several places through the three kingdoms, "the old, old story" of Cromwell's or Henry VIII.'s spoliation. Yes, Cromwell, we are seriously, and perhaps truly, informed, posted in Barking, and made the aisles of its church into a temporary stable for his horses and those of his retainers. Well, old Noll may as well bear the sin that he is charged with as well as any less noted personage. His back, when alive, was broad enough for any reasonable burden, and now that he is no longer amongst his detractors or apologists, his reputation for good or ill can suffer any amount of tension without breakage.

An arched tower, of old date coeval with the church, leads into the graveyard. A small door in one of its sides gives entrance to a winding-stair leading to a square room. Inserted in the front wall, near the corner, may be seen an old sculptural representation of the Crucifixion. The figures of the Redeemer, and the two holy women at the foot of the cross, are shown, but time, accident, or defacement has played sad havoc with the figures as a whole; the head and arms and feet in part being eaten away or destroyed.

Oliver, the Protector, is credited with being the destroyer in this case, also; and it is said that this ancient piece of stone carving was removed up into this room and inserted here, to protect it from further injury.

Now a few words, by way of finis, for the present, anent Barking; and to summarise those few words, let us say that the town of Barking is in a most wretched unsanitary condition; that it wants a good local Board; its sanitary inspector is a cipher; that its police constables have their own legitimate duties to do, which, if done well, will supply them, even in a place like Barking, with a sufficiency of work. Barking is lighted. Yes; it has a gasometer—bless the mark; but the night side of nature, in the glare of its poverty-stricken gaslamps, is in nowise encouraging to the fancy of the unfortunate visitor, and would hardly guide him to avoid being submerged in the filthy puddles and open sinks and gully-holes in the lanes and back streets, whose name is legion.

STAMPS ON BUILDING LEASES: IMPORTANT QUESTION.

The following is a copy of a notice issued by the Board of Inland Revenue on the 25th of November last on this subject:—

"The commissioners consider that in future all building leases containing covenants to build, or in consideration of a house having been built, must, in addition to *ad valorem* duty on the rent, be chargeable with 35s., as for *a separate lease, in consideration of such covenants*, the charge arising, as it is considered, under the latter part of the 16th section of 17 & 18 Vict., c. 83."

"It is also considered that a lease containing a covenant to improve, and, if necessary, rebuild, &c., is liable to that additional duty, *as for a separate lease, in consideration of such covenant*."

The Act referred to came into operation in October, 1854; a period of fifteen years has, therefore, been permitted to elapse, during which, according to the views now taken by the commissioners, many thousands of leases must have been insufficiently stamped. That this is an entirely new light which has burst in upon the commissioners is evidenced by the fact that, in 1865, we applied to the Board for an adjudication stamp on a lease in which the precise question arose, and obtained it without having to affix the 35s. stamp.

The notice, it will be observed, only intimates that *in future* all leases containing covenants to build or improve should have a 35s. stamp in addition to the *ad valorem* duty, but says nothing about the past; it is to be hoped, therefore, that the commissioners contemplate obtaining an Act to remedy the error into which they and the legal profession have fallen, if their view of the Act is correct.

They no doubt, however, feel that before applying for an Act it will be necessary to have a judicial decision upon the point, as the Court of Exchequer may possibly differ from them, as they have from their former selves, and it was probably with this view that they sounded the alarm by issuing the notice we have quoted.

The question, therefore (assuming that some remedy will be applied as regards leases already executed), is not so important as to the past as it is for the future; for if the construction of the Board is correct, building operations, and especially of houses of an inferior class, will be greatly discouraged. An addition of 35s. to the expense of every lease would be felt by builders, whether in a large or small way, and particularly in cases in which a separate lease may be required for each house.

An inflexible duty of 35s. would also be, in a great majority of cases, greatly out of proportion to the *ad valorem* duty. In the case, for instance, of a building lease for ninety-nine years reserving a ground-rent of 10*l.* (which is far above the average), the *ad valorem* duty would only be 6s., or within a fraction of one-sixth of the extra duty required. But the law, as now laid down by the Commissioners, not only applies to building leases, but to all leases, however short the term, containing covenants which in the opinion of the Stamp Office may come within the category of "a further or other consideration" for the lease; so that a covenant to rebuild in case of fire, or even a covenant to paint, &c., every seven years, or during the last year of a term, or a covenant to leave a farm in a certain state of cultivation, or to lay down arable land to pasture, or for other purposes arising out of any special arrangement between the parties, might come within the operation of the rule; indeed, as the consideration for all leases is either expressed or implied to be the rent and the covenants contained in the lease on the part of the lessee, it will be necessary in every case to look to the covenants themselves to ascertain whether they are of such a nature as to require the 35s. stamp in addition to the *ad valorem* duty; and as few solicitors will take upon themselves the responsibility of deciding what covenants bring each particular case within the rule, and what do not, the result will be, that they will either affix the 35s. stamp, or incur the trouble and expense of obtaining Adjudication stamps; for, be it observed, an Adjudication stamp only applies to the particular deed to which it is affixed, and will not give validity to other leases, though containing precisely the same provisions, in the event of the commissioners putting an erroneous construction upon the law applicable to the case.

The question is so important, that it seems to us desirable that some combined measures should be adopted, in order to obtain a judicial decision upon the point without delay, and with the ultimate view, if the decision should be unfavourable, of applying to Parliament for relief, in the event, which we cannot anticipate, of her Majesty's Government omitting to bring forward a remedial measure, and also with the view, in case of any measure being brought forward, of promoting any amendments which may appear desirable.

A judicial decision could easily be obtained by presenting a lease containing covenants to build for adjudication, and appealing to the Exchequer under the 13th and 14th Vict., cap. 97, s. 15, from the decision of the Board. The expenses would not be heavy; and if a few landlords and builders interested in the question would agree to share them, they would fall very light when divided. The principal expense, indeed, would be the fees to counsel.

We shall be happy to put ourselves in communication with any persons who will address us, under cover, to A. B. & Co., care of Mr. Anderson, Southampton-buildings, Chancery-lane, London.

A. B. & Co.

SOME USEFUL INVENTIONS.

Pain's Patent Flooring Cramp.—This cramp appears to have advantages over others, especially where the joists are bedded on concrete (to form fire-proof floors), and where an ordinary flooring-cramp could not be applied. It is simple in construction, and not likely to get out of order. It can also be used as a "lifting-jack." We have seen a couple of them raise a heavy girder.

Nevill's Patent Window.—Many inventions have been put before the public with the view of obviating some of the objections to ordinary sashes and frames, but few of them have got into use. The inventor of the window before us claims that "all lines of the sashes and Venetian blinds are effectually hidden from sight, thus preventing at all times their unsightly appearance in the room. The easy, quiet, and simple manner in which it is unfastened and opened, and the fact that the simple act of closing it effectually fastens both top and bottom sash, thus preventing the usual anxiety as to whether the window is or is not fastened, so commonly felt when retiring for the night. That when the window is closed, the entire weight is removed from the lines, and so continues until the sashes are again opened, so that no strain or weight whatever is upon the lines, except for the short time they are open, thus preventing the necessity of using metal or expensive lines." Another advantage is, that the weights cannot turn in the boxings, nor the lines become entangled, as is now so generally the case. Without going so far as to endorse all that is said of it, we are fully disposed to advise architects and others to look to the invention for themselves, as it evidently offers advantages.

Marsden's Joints.—The metallic flexible tube-joint patented by Mr. Marsden is air-tight for gas-mains, water-mains, steam-joints, drain-pipes, tunnels and sub-marine tunnels of any diameter. The object of this invention is of great importance. We all know the evils resulting from bad drain-pipe joints. His "lead joints without solder" for ships, are very valuable for steam-pipes, pumps, or other purposes, as they yield to the strain of the vessel without causing any leakage.

Hatfield's Rollers for Doors and Shutters.—When an ordinary axle and socket are used for sliding doors or shutters, abrasion takes place, and in time the door settles down, and is moved with difficulty. Hatfield's rollers obviate this very materially, as the axle of the roller runs on a plane of several inches in length, apportioned to the width of the opening and the number of times the roller consequently has to revolve. An easy motion is given to the door.

Gas Works Arbitration.—The award in arbitration as to the price of the Dundee Gas Works has been received from Mr. Pownall. The old company claimed for annuities 10,400*l.*, and get 6,125*l.*; for expenses they claimed 10,593*l.*, and get 6,400*l.* The new company claimed for annuities 4,250*l.*, and get 2,537*l.*; for costs they claimed 5,662*l.*, and get 3,018*l.* The gas commissioners calculate that they will be able to reduce the price of gas in the next two years to 3s. 6d. or 4s. per 1,000 cubic feet.

THE NEW TELEGRAPHIC ARRANGEMENTS.

IT appears to be perfectly understood, says the *Times*, that the Chancellor of the Exchequer has fully concluded his arrangements for the payment to the several telegraph companies of the compensation awarded to them, amounting to 5,715,048*l.*, the large funds of the savings-banks and other public departments, together with the tax collections due in January, being available for the purpose. The disbursement of the entire total will be completed some day at the end of January.

A long shelf, divided into a number of compartments, has been erected in the money-order department of the Post-office, for the convenience of persons who wish to write telegrams on the spot. Senders can then affix the necessary amount in postage-stamps to the message, which will be received by a clerk and sent off immediately. The telegraph-office in Bristol, and no doubt other towns, will, we hear, be open night and day the whole year through for the receipt and transmission of messages. The Government authorities have prepared new forms for messages to be written on. A separate space in lines is allotted to each word, and the corresponding charge is printed clearly on the margin, so that the sender can see at a glance how much he has to pay, and the receiving-clerk need be at no trouble in calculating how much he has to charge. Each of the forms thus divided into spaces is prepared for a message of fifty words. In the right hand upper corner of the page a blank space is left for stamps, to cover the charges of transmission. Attached to the form are directions for the guidance of the sender, with a tariff of charges, and full information as to the arrangements for the porterage.

Lord Kinnaird has induced the Post-office department to telegraph Greenwich time daily to all telegraph stations in England, Scotland, and Wales. All the Post-office clocks will therefore be regulated by Greenwich every morning, so that when persons go to post their letters they can set their watches according to the correct time of the day at Greenwich Observatory. In Ireland, in the same way, Dublin time will be telegraphed all over the country.

MISCELLANEOUS.

AMIDST the accounts of the numerous recent failures of public buildings, I have not noticed in your columns any account or explanation of the sadly ruinous state of the arcaded terrace above the fountains at the Crystal Palace.

Allow me also to call attention to the want of a flight of steps from the Holborn Viaduct to Shoe-lane.

Enamelled slate is generally used for lining urinals, but the enamelled face often decays. Could not our makers of porcelain and galley tiles produce some slabs of sufficient size for use instead of slate? They need not be so large as slate slabs, as a few joints might be allowed.

NEMO.

THE CHURCHES OF SPOLETO, ITALY.

AMONG those Italian cities where almost all tokens of life and power belong to the past, and the present is thrown quite into the shade, Spoleto is one deserving of more attention from the searchers after antiquity than is often, we believe, given to it. Whilst wending our way through silent streets among buildings that might be taken for old *palazzi* never finished, or convents long half-deserted, if ready to admire and enjoy, we cannot fail to feel the charm of romance and memory that dwells in this Mediæval town, as if diffused by a local genius all its own. Seated on the lowest advancing spur of mountains at the northern base of one of the loftiest Apennine passes, overlooking the fertile valley of Foligno, its aspect is most striking; the strong square-towered castle of the fourteenth century dominates from the highest ridge, below which its streets extend north and southward; and sunset among the Apennines, with such an accessorial foreground, presents one of those rich and solemn Italian pictures to be stored up for ever in memory's choicest gallery.

The first historic notice of the *Spoletium* of antiquity, occurs under date 240 B.C., when a Roman colony was sent to settle there, soon after the first Punic war. Cicero mentions this child of the conquering *urbs*, as "*Colonia Latina in primis firma et illustris*" (*Pro Balbo*, 21); and the great achievement recorded in the local *fasti* was the discomfiture of Hannibal by the Spoletani, when he had marched upon this place after the battle of Throsimene, and was repulsed from the gate that still stands, thence called *Porta Fuga* (or *Porta d'Annibale*), with its inscriptions commemorating the event. Besides that monument of the Roman period, is preserved another in good condition, a plain massive arch, crossing a street, whose legible inscription tells us it was erected by the senate in honour of Germanicus and Drusus; also have we to notice, under the same category, some fragments of Pagan temples built up in churches, and the ruins of a temple, supposed of Jupiter,—not, indeed, visible, though extant,—over which has been raised within late years a somewhat showy theatre. A Roman bridge, that had remained for untold centuries, buried under the banks of the river Topino, shortly beyond the gate on the northern side, was discovered some years before the change of government, but (discreditably for those responsible), ordered to be again covered up on the rebuilding of that gate which leads to Foligno. Its first interment is supposed to have been caused by a natural change in the direction of the river channel. But it is with things that belong to the Christian era we would here deal; and we may observe that a tower containing monuments of sacred architecture and other art, of dates extending from the tenth to the fifteenth century, and mostly preserved intact (though some in decaying state), has obvious claims to interest. The Spoletium of Roman origin first appears in Mediæval story on occasion of its being captured, and its fortifications in part destroyed, by Totila, during the long raging of the Gothic and Greek wars in the sixth century (*v.* Procopius, iii. 12); after which disaster repairs were effected and improvements made by the victorious Narses. In the year 576 the place yielded, without resistance, to the Longobards, who had already become masters of Northern Italy, and who forthwith chose this for the seat of a sovereign dukedom, whose princes reigned over a wide territory, including Picenum, Sabina, and part of the Abruzzi; their succession lasting till A.D. 788, when the Lombardic fell before the Frankish power, and Charlemagne appointed a duke to govern these provinces under his own suzerainty. Henceforth the Spoleto dukedom was no longer hereditary, but conferred by the kings of Italy, in consequence of which arrangement it passed from one great house to another during a long period of troublous time, and in the eleventh century became united to Tuscany, under the sway of Godfrey, husband to the famous Countess Matilda. This second dynasty of dukes came to an end about the close of the twelfth century, yielding to the power of the Pontificate as sustained by one of its ablest representatives, Innocent III.; and thenceforth did Spoleto, with diminished territory, named after its capital, sink into the insignificance of a province under the Papal sceptre, governed by a prelatic delegate up to the day of the siege by Italian forces that falls within the history of recent years. The population of the present day is given as 19 936 in the "Enciclopedia Popolare," published in Turin.

The only prominent and imposing monument of the Lombardic period left here is the aqueduct bridge that spans the deep glen and crosses the winding river, immediately below the city, on the eastern side, seen from different points of view with the high-placed castle and the irregular sweep of streets and fortifying walls, all combined in a picture most romantic. That great structure is due to the Duke Theodelapius III., about A.D. 604; but in its actual state must be referred, and probably in the greatest part, to the energetic legate, Cardinal Alburnoz, who built that castle, and reconquered sundry rebellious provinces for the pope, then resident at Avignon; and, indeed, the acute brick arches between the stupendous piers rising from the depths of that beautiful glen and from the wooded slopes on each side, sufficiently indicate such later origin; as the other, now ruinous, arches that cross those piers at less than half their height may be with like certainty referred to the original building. The measurements have been variously given,—by Calindri, as 81 mètres in height, 205·99 in length; while the native historian of Spoleto, Count Campello, gives only 200 ft. for altitude, measuring from the base to the summit of the two highest, the central piers, not intending, perhaps to include the massive superstructure through which water still flows from the overshadowing mountain.

Turning to the sacred monuments of this town, we may properly begin, observing order of date, with the far-seen S. Giuliano, a church conspicuous on a height that advances above the city from the picturesque and richly-wooded Monte Luco, a sacred mountain once famous for the many hermitages that rose in its primeval ilex-forest, many of which still stand among those shades, though the hermit-race has departed. From the dedication of this forest to Apollo, as a sacred *lucus*, the name Monte Luco is derived. Of those ancient hermitages some have been transformed into pleasant villas; others have till lately been inhabited by a few friars; and their chapels still remain, all modernized, open for public worship only on festivals,—their white walls and belfries gleaming from the dark evergreen foliage so as much to enhance the picturesque loveliness of this once holy mountain. S. Franceso, on one of the loftiest terraces, is a convent with gardens commanding glorious views across Apennine and valley, a neat modern church, and quaint buildings with long low corridors, where are now resident four friars, left out of a community of fourteen, who hospitably received us, and treated us to wine with bread and cheese in their refectory, after our long walk through forest-scenes beautiful enough to beguile any fatigue. S. Giuliano was founded by the originator of the eremite life on this mountain, St. Isaac, a Syrian, about A.D. 528, and became at a later Mediæval period a Benedictine monastery, whose abbot had control over all the hermits in his neighbourhood; but the actual building is not supposed to be in any part older than the tenth century. We were sorry to find it abandoned and evidently sinking into ruin, its interior being used as a barn and lumber-house for the farmers on the estate where it stands, and to whose owner it belongs. Its plain façade has a roof that leans against a high square campanile of grey stone, its single window of three lights, with colonnettes, adorned by the simplest description of mouldings, its round-headed doorway with a discharging arch above, and some rich mouldings on the jambs, reliefs of symbolic birds, the cross, &c. The interior struck us by its gloomy and ghost-like desolation, fit scene for weird pageants or grim adventure; under a triangular roof with bare rafters blackened by age extend nave and aisles, divided by ponderous built-up pilasters, with round arches, in strange irregularity, one arcade consisting of five, the other of but three, correspondence of length being secured by greater width of span, the chancel terminating in a narrow apse; and below the high-altar we descend by two ruinous staircases into a crypt, spacious, divided by several files of low columns, different in dimensions, and with barbaric capitals, that support stilted arches, the architectural type reminding us, though indeed inferior, of those beautiful crypts in Northern Italy, among which that of the Florentine S. Miniato may be taken as a perfect model. This of S. Giuliano is almost in darkness, the dim light admitted only through a few loopholes; and indeed throughout this deserted church we notice the scantiest space allowed for windows, and the total absence of glass, similar loopholes splayed on the inner side being the substitute for regular windows, with sole exception of that three-light one above the portals. The farmer and his wife, who have a cottage near, told us strange stories of mysterious sights and sounds to which labourers, who used to spend the night in this church, could bear witness,—noises like the wailing of human beings, or the tread of many feet, and (once seen) a lurid light flaring in the midst of the dark nave,—portents that so frightened that at last none could be prevailed upon to sleep in the haunted edifice. During the first visitation of cholera at Spoleto the dead used to be buried by night within these walls, and the gases rising from decomposition may have caused this last-named phenomenon.

We may next visit S. Pietro, a large extra-mural church which, till the eleventh century, ranked as the cathedral, and is said to have been founded in the ninth century. To that later period (the eleventh century) belong the very curious symbolic sculptures on its façade, which alone claim our attention, for the interior is but an ordinary specimen of the pseudo-Classic, or modern Romanesque. One of the most richly-varied pages of mystic art in Italian churches is that read on its quaintly-fretted front, the argument here before us, carried out in numerous small reliefs, being no other than the story of the judgment reserved for sinful

souls, that of certain martyrs, and scenes from the life of St. Peter. We see a female on her death-bed, beside which are seated that apostle with his keys, another saint to whom a demon is constrained to serve as a reading-desk, supporting the book he reads from, and the Archangel Michael with a pair of scales at hand; again do we see the same female, now a spirit though still embodied, in appearance at least, stretched naked upon a couch while two demons torment her, and the guardian angel is departing with folded wings and an expression of sorrow truly pathetic; in another part, the weighing of the good and evil deeds by St. Michael in his fatal scales, with what result in this unhappy case is apparent. Underneath, of larger size and in coarser style, are figures of martyrs exposed to wild beasts, in the Roman amphitheatre as we may infer; on another side of the portal, the calling of St. Peter and St. Andrew, to whom the Saviour is approaching on the shore, as they row their boat on the lake; also the washing of St. Peter's feet by our Lord, two evangelic subjects in which it is noticeable that neither is associated with any event or announcement implying the *supremacy* of that apostle! At the three portals are couchant animals (probably meant for lions), keeping guard at each side; but less intelligible are the reliefs lateral to and above the central doorway: *orantes*, like those figures frequently seen in Roman catacombs, a ploughman driving his yoke of oxen (probably to represent one of the four seasons, as in such series elsewhere introduced among sacred sculptures), and various animals, the ram, the lion, the griffin, the peacock, a stag in the act of devouring a serpent. A wheel-window, once the chief portal, in the centre of a large panel, at whose angles are the four evangelic emblems, in rude relief, affords the type (perhaps earliest) of an ornamentation and lighting found in so many other instances at this city, that we may consider such details characteristic of Spoleto churches. This ex-cathedral was despoiled of many precious objects by the Saracens, A.D. 847. As to its architectural singularities, and that façade built as a simple quadrilateral without tympanum, arcade, or pinnacles, Rumolier observes, that it stands quite alone, presenting nothing like a norma for the style of its period; and Ricci (*Storia dell' Archit. d'Italia*), finds analogies with the Arabian, even the Indian, in its peculiarizing features so unlike to other monuments of the eleventh century.

Some of the earliest works of Christian painting in Italy, exclusive of those in catacombs, are found at Spoleto; but we regretted to see the signs of advancing decay, the unmistakeable tokens of neglect and non-appreciation in the actual state of these curious relics of Mediæval art. We must thank Messrs. Crowe and Cavalcaselle for our first acquaintance with the frescoes in the desolate crypt of S. Ansano, to which these critics assign a date in the ninth century. That subterranean, under an insignificant modernized church, has been long abandoned to solitude, damp, and darkness so profound that the tapers supplied by the sacristan scarce suffice to enable us to see anything properly, either the rude but interesting architecture, or the dim paintings on its walls. Here we again find the stunted irregular columns in two files, the barbaric capitals, and high-stilted arches; and of that pictorial ornamentation that has once, evidently, covered the entire wall-surface, the only subjects distinguishable are, besides a few isolated figures, saints and angels, black-cowled monks, that may have belonged to groups, a scene of martyrdom, in which the victim lies across a sort of frame, whilst the executioner strikes with his sword at the downward-hanging head; also, within an arched recess, perhaps for an altar, a complicated group recognisable as the Crucifixion, though the principal figure on the cross is completely effaced, the subject being, however, inferable from the action of the soldiers and other figures still left dimly discerned by taper-light. Deplorable, indeed, is the evidence not only of decay that has done its work, but of the ruin impending over these grotesque, but valuable, art-relics at S. Ansano.

Other frescoes worth preserving (but not likely to be so unless proper steps be soon taken), at the extramural S. Paolo, are referred to the twelfth century, and are compared by Crowe and Cavalcaselle to the miniatures of a code at the Barbarini Library about coeval. They are now seen, at some trouble, above the false roof of the church and on the highest wall-surfaces of the campanile, accessible, thanks to the erection of a scaffold for some works of repair going on at the time of our visit. Nothing could exceed the barbarism of these performances, representing scenes from the Old Testament, the Creation of Eve, the Expulsion from Paradise, with stunted figures, ludicrous countenances, broad black outlines, comparing which with the infant efforts of Christian art in the catacombs, we must infer a rapidity of decline from the third or fourth to the twelfth century that seems the contradiction to all theories of intellectual progress, and would indeed be painful to contemplate if our impressions were not corrected, our feeling elevated, by the remembrance of the marvellous attainment subsequently realised, to vindicate the high claims of art in connexion with faith and intelligence. The S. Paolo Church has a Mediæval façade of small proportions, but good features; and the adjoining convent, from which the friars have been ejected, is being reduced to the purposes of an asylum for aged paupers, its pleasant and salubrious situation rendering it indeed well suited for such objects of charity.

Another extramural church, S. Ponziano, conspicuous on a knoll above the river, as we approach the city from the northern side, is worthy of a visit for the sake of its façade (eleventh century), with symbolic animals, the lamb, the winged ox, and eagle, on the lintel of the chief portal; above these, two eagles with small animals in their talons (probably heraldic); the usual four emblems at the angles of a panel around a wheel-window, and traces of painting that once covered the highest story under a triangular cornice. Here, too, we find the total contradiction between interior and exterior; the inside of this conventual church being in the poorest modern style. It contains, however, a confessional, said to be of great antiquity; in which the relics of S. Pontianus are enshrined, under the chancel. Its cloisters are now appropriated to three communities of nuns.

The cathedral of Spoleto, naturally the first object of attention to the tourist, and the most conspicuous church here, on its terrace high above the city's northern side, was founded by the Longobardic duke Theodelapius, A.D. 617; rebuilt in the thirteenth century by the architect Giovanni da Gubbio; its interior completely renovated by Bernini (in what style may be imagined), A.D. 1644; a classic portico added by Bramante, being now a principal feature of the façade, and the tower alone, though altered and surmounted by a modern spire, remaining of the more ancient of the original buildings; Ricci assigning to it, indeed, an antiquity perhaps anterior to the seventh century, assuming, with Campello, that this cathedral was enlarged, but not founded, by the Longobard duke. Its spire was added in 1519.

It is impossible to stand before this fine old church, and observe the anomalies traceable on its still majestic front, without regrets for that deplorable non-appreciation of the Mediæval manifest here, as in about nine out of ten among the older churches of that central Italian region, included, or till lately so, within the Papal States. What the Spoleto cathedral has *suffered* during the last 300 years, might be taken as a sample of the remorseless, or tasteless, dealings so common within these Italian limits, to the prejudice of ecclesiastical monuments. Of the seven wheel windows on its front, *five* have been built up; the portico, with Greek columns, though itself graceful, is utterly discordant; the interior, contrasted with such an exterior, takes one by surprise to an offensive degree. What remains most interesting is the series of symbolic sculptures on this façade; the four emblems, griffins on the summits of buttress-pilasters, couchant lions guarding the three entrances; fantastic caryatides, &c.; also the rich mosaic bordering around windows, and the arcade string-courses, the whole presenting a somewhat overcharged but splendid and imposing structure. Most precious among earlier art-works here is the mosaic in an arched recess, central to the façade, that seems to have had, or been destined to have, two companion mosaics beside it in similar recesses left bare. Though almost in every part restored, it retains a grandly antique character, and its original inscription is still read below, with the artist's name, Palmeri de Saso, and date, 1207; its subject, the Saviour blessing, with the Greek action of the right hand, holding a book in the left, the Virgin and St. John standing beside him at lower levels; the expression of the principal head severe, even grim, but the ideal of dignity not wanting in the treatment of forms and draperies. Inferior as this is to the mosaics of the latter years of the same century at Rome, it supplies a valuable link between the period of that art's deepest decline and those works at the Lateran, S. Maria Maggiore, and elsewhere, in which we hail its glorious revival. Another remnant of the original structure is the semicircular apse in which this cathedral terminates, and whose ample field is occupied by those frescoes, the masterpiece of Filippo Lippi, representing the coronation, and principal scenes from the life of the Virgin; masterly, indeed, but damaged to an extent one sees with deepest regret. We may again point out the interesting examples of the early crypt in churches at this centre, all with the same leading features, though some in ruder, others in finer production, as that of S. Gregorio, with altar and apse, a marble puteal between; and the two mentioned by Ricci, S. Paolo within, and S. Brixio beyond the walls, which that writer refers to the fifth or sixth century, an antiquity for which proof seems deficient.*

THE DIGNITY OF ARCHITECTS.†

ONE of the questions I would consider is,—Should architects enjoy the same distinctions and honours which the professors of the other divisions of the fine arts obtain? Let us inquire, however, in the first place, what is an architect?

In the country towns of Britain we have men calling themselves architects and builders, who, in the evening, are endeavouring with rough horny hands and opaque understanding to draw plans and elevations, and during the day are engaged in the more congenial occupation of hewing stone or planing wood. The result of their lucubrations is a class of buildings which seem to be manufactured by the yard, or moulded by the dozen. Again, in the small towns of our American colonies a genuine architect is a curiosity; for, as is common among the savages who everywhere surround them, every man is his own architect. The amount of taste displayed in their erections leaves a balance in favour of the savage against the civilised man. In other parts of Canada and Nova Scotia we have architects who conduct business on much the same principle as those small country grocers, who sell anything, from a beaver hat and a pair of shoes to brown sugar and screw nails. A business card of one of this class declared that "drawings were furnished and buildings put up *at the shortest notice*, also *ship models* of every description made to order." Another combined the business of an estate agent with that of an architect, and specially solicited the patronage of speculators in land. The productions of this latter class contrast as favourably in appearance with the forest from which the materials are obtained, as a stack of grain rivals a field of waving corn.

These men are not the architects whose claims to dignity we would support. For, as it is only in the most cultivated fields and the richest soil that we find the best grain, and only in the most carefully-tended gardens and conservatories that we find the most beautiful flowers, so it is only in the wealthiest, most civilised, and most art-loving countries and cities, that we find architects in the greatest perfection. No ship models or landed estates attract the eye of a great architect. His object is not to plan houses by the yard, to harden his hand with the chisel, or to cloud his understanding with glue. His houses contrast favourably with the trees amid which they are placed, and enhance the beauty of the landscape; his palaces are fit abodes for the purple, the diadem, and all earthly splendour; and his churches lead the mind up to the great God of all, awing the beholder, and solemnising the worshipper.

He is the commander of an army of workmen, compared to which the armies of Wellington or Napoleon were small. He is a great artist. He may be only one among a number of workers, yet his works are distinct, and every jewel that he sets assists in forming the grand diadem of his country's glory. He is a great poet; his lofty ideas are petrified in stone, animating and

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* The "History of Spoleto," by Campello, contains abundant detail, and begins the subject from the Deluge; but few would find this book readable, and we know of no edition later than the first, 1672. For the romantic story of the dukes, we may consult the "*Art de vérifier les Dates.*"

† The following is part of a communication addressed to us from Halifax, Nova Scotia, and is interesting as showing the growth of artistic enthusiasm in our colonies.

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elevating every generation that sees them; and as each successive year washes over their surface, darkening, and colouring, and eating them away, their meaning becomes clearer, their associations more interesting, their lessons more priceless, and their teachings more holy.

But, above all, he is the great historian and preserver of the honour of his country; for as it is by the ruins of the Egyptian palaces, the Grecian temples, and the Roman amphitheatres, that we gain the most powerful notions of the civilisation and magnificence of these nations, so if ever the same desolation should befall Britain, it will be to the remains of her buildings posterity will look for the truest evidence of her position.

Although the social status of architects has risen considerably, yet it must be admitted that they do not enjoy equal honours with the other members of the fine arts.* A leading architect is not so generally known, and his position among men of science and literature not so generally acknowledged, as that of a leading artist. His name is not so indissolubly associated with his works, and F.R.I.B.A. is not so valuable as the simple R.A. We have read, also, histories of England, where music, painting, sculpture, poetry, literature, fashions of dress, and even the architecture of coaches are noticed, accompanied with lives of the great men celebrated in each department, and yet not a line is left either for the "noblest of the fine arts" or the men celebrated in it. It is astonishing, too, how ignorant even educated men, distinguished in literature, are of architecture and architects. Macaulay, in his "History of England," says of Sir Christopher Wren, "No man born on this side of the Alps has *imitated* with so much success the magnificence of the palace-like churches of Italy," as if his chief greatness consisted in being a good imitator! And he also calls architecture "an art in which none but a geometrician can excel." Such are a few of our grievances. Still, we would not wonder at uninterested people caring little whether architects were or were not as good as painters; but that an art-critic like Fergusson (who, above all others, one would think, ought to exalt them), should, in his "History of Architecture," declare that they are too much honoured and recognised, and that architecture will never be the noble art it once was till they are forgotten altogether, is beyond ordinary comprehension. I cannot conceive how any one living in the nineteenth century, and understanding the workings of its institutions, and the aspirations of its men, can advocate the theory that it is only by degrading the workmen that the work itself will rise in public estimation, or only in ignobling the artist that the art will become more noble.

It may be all very poetical to lament the days when men were unambitious (if such a time ever existed); when men of learning, wealth, and power studied architecture as a polite accomplishment, or a pastime to while away the troubles of ennui,—giving to the world their beautiful creations of the fancy and the intellect to be engraved in imperishable stone,—never dreaming of associating their name with them,—never wishing to become great. But these times are all passed away. We honour a man who exhibits great talent, be his profession what it may, and therein is Britain's greatness; for every son strives to be greater than his father, under the certainty of being honoured if he is successful. By what calamity is it, therefore, that architects are to be an exception to the general rule? Is it because it has been discovered that the downfall of a nation has always been preceded by great architectural magnificence, and that architects, therefore, are an indirect cause of a nation's decay, by creating refinement and effeminacy? No. The reasons adduced by Fergusson are:—Firstly, that architecture is a useful art; and, like all useful arts, the names of those who are eminent in them are not meant to be remembered. "No one cares," he says, "who invented all the multifarious processes of modern agriculture, or who designed the *Warrior*;" and he draws the conclusion that no one cares either who were the architects of buildings which are the admiration of the world. But agriculture and ship-building are only two of the useful arts; and, as his remarks apply to all, how does he account for the names of Watt, Stephenson, Palissy, Wedgwood, Arkwright, and many others being highly honoured and venerated as inventors and improvers in their several arts? Or would he have these men forgotten also.

He also says, "Every useful art is capable of being refined into a fine art." "Identically the same process which makes the difference between a boiled neck of mutton and a dish of *côtelettes à l'Impérial*, can convert the most common-place building merely designed for shelter into a palace or a temple." According to this theory, therefore, an architect is intellectually no superior to a cook; and a cook displays as much science, skill, poetry, and genius in making a pudding as an architect in drawing plans for a house! Let us apply one test to this hypothesis. Things and men are valuable chiefly on account of their rarity. Diamonds would be comparatively worthless, if they were as plentiful as road-metal; and gold would not be as much prized as iron, if it was in as great abundance. Is a great architect, then, a rare or a common personage? The *greatest* cooks (if such a term may be applied to them) can be hired by the dozen in every large town; but, among the thousands of architects in Britain—no matter what reputation they may at present enjoy—how few among them will be called great outside the generation that knew them. The very best among them will probably be cursed and maligned for their desecration of our cathedrals and abbeys, and for covering the country with erections apparently newly risen from the tombs, and with their grave-clothes on.

How few have shown the natural genius of Kemp, who, condemned to work as a common mason, yet had lofty thoughts soaring far above his chisel and his mallet; who, unknown and uncared for, travelled over all Britain and the Continent, working at his trade, making drawings, and breathing in the life of those beautiful Gothic structures which were still considered the works of barbarians; and who, when the fulness of time had come, burst upon the world as a star of the first magnitude, erecting that edifice which shall remain to future generations as much a monument to himself as it is to Sir Walter Scott. Judged by the preceding test, neither cooks nor engineers, painters nor sculptors, should be put on a level with a great architect, for no artist is so rare as he.

His second reason against architects is "because the names of the Mediæval architects have not been preserved, so neither should the names of architects of the present day."* He surely does not believe that the *bonâ fide* Mediæval architects were so simple as to keep their names hidden from the people, and that the people were so uninquisitive as not to inquire who were the designers of those beautiful buildings which were being erected in their midst. He surely does not believe that these men never dreamt and hoped that their names would be immortal as long as their buildings should exist, and that future generations would pay them the honour which they so richly deserved. The desire of being remembered after death is a feeling too deeply implanted in man to be easily got rid of, and we have no reason for believing that the Mediæval architects were any exception to the general rule. The fact that the buildings themselves were so long unnoticed and allowed to fall into decay is sufficient to account for the names of the architects not being preserved. The revival of Gothic architecture has, at any rate, accomplished one good object, in leading to the perusal of old records in order to discover the names of those who designed these wonderful buildings; and we are glad to find that it has been accompanied with such success that many have been rescued from their temporary oblivion. We hope that the search will be continued till the presiding genius of each of the cathedrals has been discovered and brought to light. And we have no doubt but that a series of the "Lives of the Mediæval Architects," will be as interesting and as instructive as any of the "Lives of the Poets" or painters of the past or present century.

If a general were not to be credited with the success of his forces, how many men of rank and talents would join the army. If a doctor were to be separated from his surgery cases, a lawyer from his court trials, an author from his books, an artist from his paintings, and a sculptor from his statues, would all these professions be filled with better and more talented men, and would our arts and sciences occupy a still higher position than they at present possess? We think not. Neither, then, would architecture. Instead of its being reanimated with a new fire and vigour, its whole soul and nobility would depart, and nothing but veritable dross would remain.

Let architecture, then, be raised as high in dignity as any profession, and the honour will not be lost; for whatever is given to the men, they will give it back again with tenfold interest to the country. The empire gains in wealth and importance from the measures of the statesman; the minds of men are opened and enlightened by the studies of the philosopher; the eye is pleased with the pictures of the artist; and the whole nation is refined by the works of the poet. But are people not also improved and refined by the works of an architect, and does a nation not gain in importance and respect through them? England gains in consideration through Shakspeare and his works, and no doubt Egypt gained in respect and importance through her poets; but while in the latter case they are lost in oblivion and their works have followed them, the works of her despised architects still tell of her glory. So though no such calamity may ever befall Britain, may the works of her architects be of such taste, grandeur, and magnificence, that as long as she exists as a first-class power, all strangers, be they from whatever country they may, will go away still more and more impressed with our empire's greatness and worth.

ANDREW DEWAR.

* An exception must be made in favour of France, which very lately handsomely acknowledged an architect to have executed the completest work of art in the country during the past five years.—A. D.

* If he objects so much to the names being preserved, what must be his disgust at the late enterprise of the *Builder* in publishing their portraits also?—A.D.

THE NEW HALL OF THE INNER TEMPLE, LONDON.

THE Inner Temple Hall, now rebuilt, occupies the site of the ancient hall of the Knights Templars, but has been greatly extended in all its dimensions. The new hall is 94 ft. by 41 ft., and its height to the wall plate is 40 ft. The previous hall was 70 ft. by 29 ft., and the height to the wall plate, 23 ft.

In digging the foundations remains were met with of a still earlier hall, of smaller dimensions, but of extremely solid masonry, of Norman character. In removing portions of the oldest foundation walls, several carved capitals, and other architectural details, were found built into the interior of the walls. The execution of these was so perfectly sharp and clean, as to make it probable that they had never been exposed to the weather, nor even set, in their places, but that, owing, perhaps, to some change of plan, they had been used in as rubble. These fragments are all of late Norman work, coinciding in date with the older portion of the adjacent Temple Church. One of these fragments is deposited in the Museum of the Institute of British Architects.

Owing to the slope of the ground, and to the depth of the foundations, there are both a basement and a sub-basement story under the hall. Under the western end of it is a vaulted crypt, hitherto used as a wine-cellar, but which it is intended to carefully restore to its original form.

In rebuilding their hall, the benchers have availed themselves of the opportunity to greatly extend and improve the domestic offices, and to provide commodious robing-rooms, lavatories, &c., for the use of members, and of students, and to obtain better clerks' offices.

New offices have also been built for the treasurer, and the Parliament chamber has been increased in size. The buildings have been erected under the able superintendence of Mr. S. Smirke, R.A., by Messrs. Trollope, who have executed their work rapidly and substantially.

The exterior masonry is in Portland stone, being a freestone which, when rightly selected, has proved itself to be best suited for a London atmosphere. The interior of the hall is built of the hardest quality of Bath stone. The roof, screen, and wall linings, are all executed in wainscot. The hall is warmed by Messrs. Haden's apparatus, and lighted by Strode's sunburners in the roof, and by sixteen bracket-lights, of burnished brass, against the walls, each having a large cluster of jets: these have been executed by Messrs. Hardman & Co., of Birmingham. The oriel window, at the upper end of the hall, is brilliantly glazed with stained glass, in armorial devices, by Messrs. Clayton & Bell.

The rest of the windows are at present glazed ornamentally in leaded lights and plain glass, but it is believed to be the intention of the benchers ultimately to glaze the whole of the windows with richly-coloured devices, illustrative of the history of the Temple.

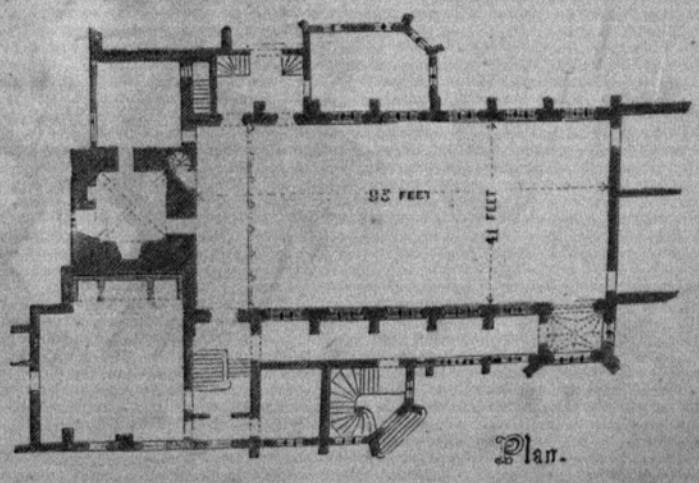
THE NEW HALL OF THE INNER TEMPLE, LONDON.——MR. SYDNEY SMIRKE, R.A., ARCHITECT.

MR. BENJAMIN FERREY, F.S.A.

Architect of St. Stephen's Church and Schools, Rochester-row, Westminster.

The New Hall of the Inner Temple.

Mr. Sydney Smirke R.A. Archt.



Plan.

THE MASON'S SQUARE IN GLOUCESTER CATHEDRAL.

MR. J. T. D. NIBLETT has been led to write some observations respecting the very singular, if not unique, *Mason's Square*, which forms a bracket against the east wall of the south transept on the right-hand side when descending into the crypt. Mr. Niblett says, —I have jotted down some particulars respecting it, and my attention having been now particularly drawn to it, I am induced to send these few notices respecting it, with the hope of obtaining further information, and consequent enlightenment. It is formed of a single stone, projecting horizontally 3 ft. 2 in., and being 2 ft. 2 in. in its widest part. It has a long arm and a short arm, like a blacksmith's square of the present day. The whole of it underneath is made to represent groining, and it has a battlemented edge all round. At the base, where it springs from the wall, is an old man acting the part of a Caryatides: he wears an apron, and has some implement stuck into his belt: above him, on the groined ribwork, is a young man in a smock-frock, clinging, as it were, in desperation to the ceiling. This bracket has evidently supported the image of some patron saint: the iron dowels that held the effigy still remain; whilst a battlemented moulding above shows how far the head of the effigy extended, and forms a finished margin to the work. The legend is, that the master mason, who built the upper part of the tower from the springing of the four great arches, found that the apprentice, during his absence, had exceeded his commission, and had done his work so well that in a fit of jealousy he killed him on the spot. But this is the common Freemasons' legend, which Mr. Billings speaks of in his architectural account of Rosslyn Chapel, Scotland, adjoining Hawthornden, the seat of the Sinclairs, hereditary heads of Freemasonry in Scotland. When I was there, two corbels were pointed out to me on either side the west end of the chapel, on the inside,—one representing an old man's head; the other that of a young man, which had a *red streak* across the brow. In Lincoln Cathedral there is also something similar, but I do not remember what it is like, for it is many years since I was at that grand old minster. I shall be glad of information on this point. These doggrel rhymes are current respecting the Gloucester bracket, thus—

> "John Gower,
> Built Gloster College,
> Campden steeple, and Cicester tower;
> But what vexed him right sore,
> He never lived to build one more."

Some readings give Bower: both these names are to be met with in this county. *Bauer*, n. s., in German, signifies a builder; *bauen*, v., to build. There was an architect in the abbey (the present Cathedral), and he was one of the 13 chief officers of the monastery, and a professed monk. His title was 'Magister Operis.' This bracket had nothing to do with him, I should think, for neither of the figures is a shaven monk. Otherwise, one might refer to Seabroke, who began, and the other to Tulley, who finished the tower, as commemorated in this monkish distich:—

> "Hoc quod digestum specularis opasque politum,
> Tullij *hec* ex onare Seabroke abbate jubente,"

which, by the bye, I have never as yet seen satisfactorily translated. Query, does the second word of the second line, which decidedly reads *hec*, do duty for *hic* or *hæc*?

I think the bracket was probably due to the piety of the principal mason employed, or the builder who took the contract, and gave money to maintain a lamp and to secure masses for his soul.

The earliest representation of this bracket that I know of, appears in Carter's Etchings in 1785, size of print, 7½ in. by 6½ in.; a second appears in Britton's Gloucester Cathedral, pl. ix.; a third in John Murray's Handbook.

Gloucester was an abbey of Benedictines.

Cirencester an abbey of Augustine Monks.

Chipping Campden belonged to the Nuns of St. Werburg, Chester. All three distinct societies, so that it is doubtful if John Gower built them all, unless he was the Gilbert Scott of the day. The upper part of Gloucester tower was built in the middle of the fifteenth century: Seabroke was abbot from 1450 to 1457. Though the other two towers named are in the Perpendicular style, yet there is nothing to show that they were contemporaneous; there are no records of these other two as to when they were built. In "Bigland and Fosbrooke's City of Gloucester," folio edition, page 127, and quarto edition, page 254, is an attempt to explain the meaning of this design, referring the reader to Carter, and to a publication by the Antiquarian Society. It is there entitled "Gower's Monument."

Now, as we are on the subject of Masonry and Free-masonry, I would call the attention of the curious to the masons' marks in the cathedral: they are particularly to be observed on the massive Norman pillars of the nave. The same marks are repeated several times. I have not been able to discover any of these marks on work later than that of the Norman period. For my part, I think they are nothing more than the marks of ordinary masons, as nowadays, that each man may be able to recognise and point out his own handiwork. Some gentlemen of the Craft, I know, think otherwise. One mark is a large and decided capital A, of Mediæval form, which would be a case, perhaps, in point, unless it be intended for the initial of the word Adonai (in Hebrew, the Lord), used as a charm against the Evil Eye.

SCHOOLS OF SCIENCE AND ART.

Mr. H. Cole, C.B., at Manchester.—A meeting has been held in the Mayor's parlour, Town-hall, Manchester, to hear an address by Mr. Cole, "On the Educational Advantages of Circulating the Works of Art from South Kensington Museum." The mayor presided. Mr. Cole, in course of his address, said he had read in books that three centuries ago there was hardly a hamlet—1,300 parishes existed then—in which they had not practically something like a picture gallery. The churches were the picture galleries; their walls were covered with pictures, and now-a-days they could not go into any old church and scrape off the whitewash without finding pictures, which had been intended for the instruction and good of the people. Besides these picture galleries, art was carried into all kinds of employment. Some of those who were present had no doubt been at South Kensington Museum, when the "loan collection" existed, and had attended at Paris in 1867, when a collection of works of art of past ages was brought together. He boldly said, that at the present time, in respect to certain kinds of art, especially in working in metals, the work done was nothing like the work which had been done three centuries ago. A comparison of the metal-work before the Reformation with the metal-work of the present time showed that we were infinitely behind our ancestors. Assuming for an instant that Manchester was able to start a fine-art institution, it was quite obvious that the collection of ancient works of art must necessarily be limited; but he was sure it would be their own fault if they did not make South Kensington Museum fill it for them. He should rejoice to see a system established by which a great storehouse should be opened in the metropolis, or somewhere else, for which there should be a distribution of works of art to places throughout the whole country as they made provision to receive them. Such a system would bring about frequent changes at the various museums, instead of the present stereotyped works on their walls. The South Kensington Museum sent art collections as far as it could, and at the present time it had sent to Manchester, at the request of Mr. Birley, to the Missionary Exhibition, the Abyssinian trophies which had cost the country eight or nine millions of money to obtain. If the Government made a collection of the superfluities which he knew to be in existence, there might be four or five collections of works of art for distribution in the provinces. He thought the people of Manchester ought to hold their member (Mr. Birley) personally responsible, in some degree, if this suggestion was not carried out.

The Manchester School of Art.—The annual meeting of this school, and the distribution of prizes to the successful students, have taken place in the lecture theatre of the Royal Manchester Institution, Mosley-street. There was a numerous attendance. Sir Thomas Bazley, bart., M.P., presided. Mr. Muckley (head-master) read his report for the past year, which stated that there were at the present time not less than 800 pupils receiving instructions through the agency of the school. I am positive, says Mr. Muckley, that the general standard of our work would be greatly raised if the lighting were better suited to our requirements. The premises we now occupy are doubtless commodious in many respects, but they lack the most important desideratum; and sooner or later, I am persuaded, the difficulty will have to be dealt with. A considerable number of the advanced students still continue to pursue their career in the school, with the hope of gaining their livelihood as painters. The present condition of the school has been commented on in the strongest terms of favour by the Science and Art Department; and in some of the stages of its work, all the other schools of the kingdom are recommended by the Department to take Manchester as their model. A large number of books and other prizes has been awarded to the students in national competition, also a prize of 3*l.* 3*s.* by Messrs. Oliver & Atcherley, for a design for silk. The chairman distributed the prizes.

The Wolverhampton School of Art.—At a recent meeting of the committee of the late South Staffordshire Exhibition, it was resolved, after much discussion, to give 500*l.* of the surplus funds to the Wolverhampton School of Practical Art. This amount will enable the trustees of the school to obtain 1,000*l.* from Government, upon condition that the building be also devoted to education in science as well as in art.

Art in Bradford.—There is a movement in Bradford towards the organisation of an Exhibition of Art in that town. The scheme may require nine or twelve months to mature in.

Science Classes for Hereford.—A meeting of influential gentlemen of this city has been held at the Blue Coat School, for the purpose of establishing science classes under the minutes of the Committee of Council on Education. A large local committee was formed, the mayor consenting to act as chairman, the Rev. E. Rudd as secretary, and Mr. With as assistant secretary, in accordance with the regulations of the Science and Art Department. It is proposed to open classes in connexion with the Blue Coat, Scudamore, and St. Peter's schools; also an evening class for young men who may wish to devote their time to the study of science. A special class will be opened for school-masters and others who may wish to qualify themselves as science teachers in the neighbouring districts. The charge will be a nominal one of 2*s.* 6*d.* per quarter to those who undertake to attend twenty-five lessons, and present themselves for examination in May next to compete for certificates, prizes, and scholarships. The classes will be conducted under the general management of Mr. With, assisted by Mr. Walter Jeffery, of Gloucester, certificated lecturer in science, and by Mr. Akeroyd, second master of the Hereford Blue Coat School.

The Chester School of Science and Art, and City Library.—A public meeting in furtherance of the objects of the Chester School of Science and Art, and City Library and Reading-room, has been held in the large room at the Town-hall. The hall was filled. Drawings of the students and others were hung around the platform. The mayor presided in the absence of the Marquis of Westminster from ill health. The Dean of Chester addressed the meeting, as also Mr. Buckmaster, who said he was glad now to find that there was a prospect of the subject of science and art in Chester being placed upon something like a proper basis; and that the noble room in which they were assembled that evening would be taken for very many years to come for the same purpose to which it was devoted that evening. He had some difficulty in seeing exactly the connexion between science and art and racing, although he believed there was a great deal of science and art in racing; but it somehow happened that the science and art and the racing came very awkwardly together; and it was very desirable, if possible, that some little arrangement should be made by which the advantages of science and art should not interfere with the races, nor the races interfere with the payments of those who had been engaged in teaching science and art in this place. He hoped whatever advantage they might be of to the place, that the races would not interfere in the slightest degree with what he believed to be the more serious work in which they were engaged. The mayor distributed the prizes.

The Sewage of South Side of the Thames.—We understand that the Native Guano Company, now treating the sewage of the town of Leamington by the A.B.C. process, have applied to the Metropolitan Board of Works to enter into a treaty with them for the concession of the sewage on the south side of the Thames. The question has been referred to the Works Committee.

SANITARY CONDITION OF GOOD HOUSES.

IN your issue of Dec. 25, 1869, I am pleased to see that "A Builder" criticises my letter of the 4th December, as it shows that in some quarters, at all events, it has been read and considered. "A Builder" does not question the correctness of my description of the state of things existing in suburban and other middle-class houses in the matter of sanitary arrangement, but confirms that description by saying that it "no doubt exists largely." I did not fear that any one, even a builder, would be bold enough to dispute the facts I stated, and there is no doubt whatever, however lamentable and disgraceful it may be, that the house I inhabit was, a few months ago, a fair sample of thousands in London.

I do not find that in my former letter I assigned any specific "causes" which lead to the building of such houses, and I am quite willing to agree with "A Builder" that ignorance has quite as much to do with it as any other assignable cause. Ignorance is a very formidable enemy to encounter, and when combined, as it commonly is, with a sovereign contempt for all suggestions from outsiders, the ignorance of speculating builders and their subordinates, when attacked directly, is almost invincible. Builders proper, too, are not so enlightened as they might be. I prefer to appeal to householders themselves, and if only the universal apathy which prevails in their minds on the subject can be overcome, I have little doubt that landlords will soon find that ignorance does not pay, as houses in an unsanitary condition will remain tenantless, and then there will be some hope of amendment.

"A Builder" says I am certainly wrong in concluding that the occupants of such houses are at the mercy of either landlord or builder, as, he suggests, that by employing a respectable surveyor to inspect a house before occupying it, a tenant may be assured that it is in a habitable condition.

Doubtless, there are many surveyors thoroughly competent to give a sound opinion, and sufficiently impressed with the importance of the subject, but I fear there is also a large number who, if they find a bell-trap and sink-stone, and a syphon in a cistern overflow, will agree with the plumber that all has been done that it is possible to do.

Since writing before, I have had occasion to go over a house which, from the circumstances of its erection, ought to have been an example worthy of imitation. It is situated in a north-western suburb; it was built a few years ago at the owner's expense, for his own occupation, by a highly respectable firm of builders, and from the plans of a first-class architect. The specification for the drains simply stated that a line of 6-in. stoneware pipes was to be laid, with branches for closets, sinks, and stack-pipes. On examination, I found two sinks in the basement connected direct with the drain, the wastes having loose bell-traps. The scullery cistern overflow had the mildest attempt possible at a syphon trap, say about half an inch; the lead soil-pipe from two closets entered the socket of a stoneware bend under the pantry floor, and either no joint material had ever been put in, or it had been of so poor a nature that vermin had destroyed it; at all events, there was a clear outlet for gas to the space under the floors. The air in this basement, especially early in the morning, was of course very foul. Upstairs, the cistern overflows, bath wastes, &c., all joined the soil-pipe, and there was a safe under a lavatory in the bath-room, with a little bell-trap, into which, in the ordinary course of things, no water went; the outlet from this (apparently to ensure a stronger dose) was taken directly into the soil-pipe from the downstairs closet, which joined the main drain below a syphon bend, which, in a lucid interval, the pipelayer had fixed in the line of the drain. This house is situated about 140 ft. above Ordnance datum. At Hampstead, somewhat higher, I have it on good authority, that sewer gas has passed through 10 in. of water. It is clear, therefore, that such traps as existed here were practically useless.

It can easily be imagined that the smell in the bath-room could not but be both abominable and abiding; if it had not been tolerably well ventilated, the house must have been uninhabitable. It is really astonishing how we manage to exist under such very disagreeable circumstances. As is to be expected, illness has not been absent from this dwelling. I have entered at length into this detail, in order that persons unacquainted with drainage arrangements may be able to pick out in their own houses the weak places. I am encouraged to do this, seeing that as some of my former remarks were quoted in the *Lancet* and the daily press, these papers may think proper still further to stir up medical men (who require it) and general readers, on one of the most important matters that can engage their attention. The facts being as above stated with regard to a house built under the most favourable conditions, what may we not expect where speculating builders, utterly ignorant and reckless, have the whole affairs in their own hands? It is to insure a certain amount of intelligent supervision over such men, that I suggested that powers be given to district surveyors to compel the carrying out of drainage works on sound principles.

The case of "Davies *v.* Remmett," referred to on p. 1036 of the *Builder* for 1869 goes to prove that tenants are, as I asserted, to a considerable extent at the mercy of their landlords. I happen quite accidentally to know something personally of this case, as the plaintiff is a relative of an intimate friend of mine; and I heard from Mrs. Saunders Davies's own lips a description of the house they occupied, of the horrible smells there existing, and of the cruel suffering they endured through the death of one child, and the serious illness of other members of the family. In my own mind I feel certain that, notwithstanding the certificate of the physician and the decision of the jury, the primary cause of the illness was the breathing of sewer gas, admitted into the house by imperfect arrangements. I repeat, that the plaintiff in this action was at the mercy of the landlord. The life of one of his children was lost, and to save the rest he felt compelled to beat a hasty retreat, fearing more lives might be sacrificed; the law of the land at the same time giving him no redress, but deciding against him on the question of rent. No doubt, in a legal sense, this decision is right, but morally it seems a cruel case. Surely the time has come when the necessity for such actions should have ceased. It ought not to be possible in these days, either in the public refuges of the poor or the luxurious mansions of the rich, that children should run the risk of being poisoned in their beds, or that the span of life of the invalid should be shortened by the inhalation of foul air which may readily be prevented entering their dwellings.

J. M.

THE NEW PROPRIETARY HOTEL AT HANLEY.

THE Queen's Hotel, erected by the Hanley Hotel Company (Limited), from the designs of Messrs. Robert Scrivener & Son, of Hanley, architects, is ready for occupation. The style of the building is modified Italian. As it is intended to make this a first-class commercial hotel, the principal place is given to the commercial rooms. The basement, which is entered from Bagnall-street, includes numerous cellars, boiler-house, ice-house, washhouse, and laundry. The principal entrance is in Albion-street, by a short flight of steps leading to a vestibule, and the following are amongst the rooms on the ground floor:—

The commercial-room, 38 ft. long by 20 ft. wide, exclusive of a large bay window looking into Pall-mall. Adjoining this is a room 26 ft. long by 18 ft. wide, to be used as a show-room and writing-room. On the Bagnall-street side is the large dining-hall, 50 ft. long by 25 ft. wide and 25 ft. high; a serving-room adjoins, and beyond is the private billiard-room, 30 ft. long by 20 ft. wide, exclusive of a bay window, which looks over the bowling-green. The bar is placed in the centre of the building, and opposite the entrance-hall, and from it can be seen the doors of the principal rooms and the side entrance. The manager's room adjoins the bar, and a waiters' room is on the other side. The butler's pantry and plate-closet are close to the principal staircase.

On the left of the entrance-hall are the porters' and luggage rooms. The coffee-room is 28 ft. long by 20 ft. wide, exclusive of a bay window. The smoke-room is 26 ft. long by 18 ft. wide, and is entered from a corridor on the north-east side, as is also the public billiard-room, which is 30 ft. long by 20 ft. in width. A glass screen divides the corridor at this point. The kitchen, which is 30 ft. long by 25 ft. wide, is lighted from the top by upright lights, above which is a lantern fitted with louvres for ventilation. There is an open court, 66 ft. by 34 ft. between the main building and the kitchen range of buildings, and the principal rooms can be served from the kitchen without the necessity of the servants crossing the hall. On the first floor there are two large rooms which may be used as board or arbitration rooms or as private sitting-rooms, fourteen bedrooms, two dressing-rooms, bath-room, and housemaid's room; on the second floor, eleven bedrooms, two dressing-rooms, one bath-room, linen closet, and housemaid's room; and on third floor, thirteen bedrooms, one bath-room, linen-closet, and housemaid's room. In addition there are lavatories, &c., on every floor, and a hoist for lifting coals and water to the upper stories. In all, forty beds can be made up in the hotel, and at a comparatively small cost twenty-four more bedrooms can be added. In the roof, over the main staircase, a wrought-iron cistern has been placed, with a capacity of holding a reserve of 2,000 gallons of water. Another cistern, capable of holding 600 gallons, will be kept filled with hot water from the boiler on the basement story. From pipes connected with these cisterns hot or cold water can be drawn at any hour of the day or night. Pains have been taken to secure a perfect system of ventilation *without draughts*, and the more effectually to accomplish this object each fireplace is supplied direct from the outside with air for combustion; at the same time vitiated air is to be allowed to escape, and smoke prevented. At the rear is a bowling-green, and there is also stable accommodation for twenty-four horses, with lock-up coachhouses, &c.

The building is constructed of red brick, with quoins of white brick, and dressings of Hollington stone; and it has been erected from the original competition plans and designs, without any alteration. Mr. Alfred Barlow, of Stoke-upon-Trent, was the original contractor for the building, and the works have been completed by the trustees of his estate. The tender of Mr. Joseph Scarratt, of Hanley, was accepted for the painting and paperhanging. The total cost of the building is about 15,000*l.*, exclusive of Mr. Scarratt's contract, which was about 450*l.*

A HINT TO HUNGERFORD.

SIR,—Just where the old London and Bristol coach-road intersects the Oxford and Salisbury road, and exactly half way between the two former as well as the two latter cities, stands a sleepy, dreary, and bovine-spirited market-town yclept Hungerford. It is watered and drained by the Kennet. The High-street is built upon the east and west sides of the Oxford and Salisbury road, and in the gutter thereof stands a hideous Georgian town-hall, surmounted by a bell-turret and clock, which, in the movement of the hammer, is in keeping with the jog-trot of the place, for scarcely has it finished striking twelve ere it begins to chime a quarter past. There are two hotels, and these, as well as the church, and all the houses and shops, were built about the same year the town-hall was erected, and they have each and all as many pretentions to architecture as one another.

The present population is evidently satisfied that it cannot improve what its grandfather did; for not only do the streets and the dwellings remain as its rude forefathers left them, but even the cesspools, and what keeps them employed as well. A trowel or a hammer is never heard,—in fact, all that engage the attention of the inhabitants are mangold wurtzels and manures, and swelling the heaps of that worldly commodity which begets more selfishness than anything else mother earth produces. There are few, very few, of the houses that are not occupied by their owners; consequently men do not care to increase the comforts of their own wives by raising the ceilings, enlarging the windows, improving the sanitary arrangements and ventilation, and otherwise making the picturesquely situated town Victorian instead of Annian.

The church is one of the most painful of the Georgian burlesques upon Tudor. It has a squat tower, nave, north and south aisles, an apsidal chancel, and a number of octagonal buttresses, which are of uniform size all the way up, and, of course, do not act as buttresses in any way. But dreary, worm-eaten, and unsophisticated as the town is, it is not half so comfortless as the railway station. This is the most barn-like and desolate of all the many barnlike stations on the Great Western Railway, and to put anything human out of a train there ought to be actionable.

GARGOYLE.

INAUGURATION OF THE GIBRALTAR WATER WORKS.

THESE works are nearly completed, and the inauguration by Lady Airey, took place on the 8th of December. The Sanitary Commissioners, in their address, said:—

"No one will hail with greater joy than your Ladyship the success which the efforts of the Commissioners have been crowned, by the blessing of Divine Providence, in searching for, and finding, a supply of fresh water which has been pronounced by several competent analysts to be quite wholesome, and, indeed, excellent. The Commissioners have every reason to believe that the supply will be ample for all the wants of the population, and can be made available on a scale so liberal, and at a cost so trifling, in almost every house, barrack, and quarter on the Rock, as to entitle the works about to be inaugurated by your Ladyship, to be regarded as the greatest benefaction which could befall this ancient fortress, so long the renowned possession of the British Crown.

The maximum daily allowance of water to the troops in garrison is at present two and a half gallons per man, yet this inadequate quantity is greatly in excess of that which the thousands of the civil population inhabiting the higher parts of the town are able to obtain. But within a very few months the Commissioners hope that every inhabitant of the Rock, both civil and military, will be supplied with a minimum of ten gallons daily at a lower rate than has been paid for the former scanty supply."

Sir Richard Airey, the governor, in his address to the Sanitary Commissioners, said:—

"It is an inexpressible gratification that the great blessing of providing the city and territory of Gibraltar with an abundant supply of good water, should have been accomplished during my administration of the Government—and while we thank the Almighty for this gracious dispensation, we do not forget our acknowledgments to you, Gentlemen of the Sanitary Commission, to Mr. Roberts, the Civil Engineer, and Messrs. Kyan, the contractors, for the unflinching energy and untiring exertions which you have displayed in bringing to perfection these great works—entitling you, individually and collectively, to the gratitude of the present and future population of Gibraltar."

The water was turned on in the centre of the square, where a temporary basin with jets was placed where a fountain to be named "The Airey Fountain," is to be erected. The turning on of the water was followed by a general salute, bands playing "God Save the Queen," and a round of hearty cheers from the assembled spectators.

LEEDS BRIDGE COMPETITION.

SIR,—I observe in your journal of last week that reference is made to the surveyor of the corporation.

Mr. Fenwick, to whom, no doubt, allusion is made, has no official appointment under the corporation, but his firm (Martin & Fenwick) have been engaged as arbitrators and valuers in the purchase of property required for street improvements; and, to prevent any erroneous impression, I beg to inform you that I have not competed for the work.

A. M. FOWLER, C.E., Borough Surveyor, Leeds.

MIDLAND COUNTIES IDIOT ASYLUM COMPETITION.

SIR,—From the fact that the conditions of this competition appear to have been very fairly drawn up, and that the committee have asked each competitor to name three architects of eminence from whom they may select their professional adviser, it is to be hoped that the result of the competition will be more satisfactory than several which have been lately under notice.

As it is impossible for the competitors to address the committee, may I ask them, through your pages, when they have made their award, to exhibit the various plans which have been sent in.

The only recompense which the majority of architects obtain for their trouble in competing, is the educational process they go through in studying the requirements of the building in hand, and they are surely *fairly justified* in asking the opportunity to inspect the several designs, in order that they may see how others have treated the subject as well as themselves.

COMPETITOR.

PHOSPHORIC PASTE.

SIR,—I shall feel obliged if you can obtain me some information on the subject of a phosphoric paste recently spoken of in your paper as having been adapted by a French chemist to rendering door numbers, &c., luminous.

I wish to know if the thing is practicable, and, if so, how I can find out where to obtain some of the paste.

E. P. B.

RESPONSIBILITY OF SEPARATE EXECUTANTS UNDER THE METROPOLITAN BUILDING ACT.

District Surveyor of St. James's v. *Strode & Co.: as to Sun-burners.*

THE District Surveyor is not quite satisfied with the report of this somewhat important case published by us in our number of December 25th last, and he forwards to us the following supplementary statement, which we willingly print:—

The case was laid before the Worshipful Magistrate as a friendly issue, to raise a question of law; namely, whether the apparatus of "Sun-burners," when fixed by the manufacturers, not as sub-contractors under a general builder, but as separate tradesmen, expressly refusing to be sub-contractors, ought to be made the subject of a separate notice. In thus stating the case, the District Surveyor pointed out that what he really required was that the apparatus in question should be brought into the general contract, and the responsibility to the Building Act thus accepted by the general builder, in order to allow the public officer to deal with it in a business-like way. Otherwise, he said, if the gas engineer, as in this case, absolutely declined, for private reasons, to surrender his independence, then he ought, as an essential condition of such independence, to stand in the eye of the Building Act as an independent "builder," giving his independent notice, and ultimately becoming liable for his independent fee.

The District Surveyor produced the notice given by the general builders, and with reference to the appearance of the word "flues" therein, mentioned that the notice was, in fact, drawn from verbal explanations of a foreman by his own clerk (under general instructions to render to builders all the aid in his power), and that this word expressly referred to certain chimney-flues which the builders had accordingly constructed, the "sun-burners" having been never mentioned at the time, but subsequently discovered in the course of the supervision of the works of the general builders.

Mr. Sleigh, barrister, appeared for the defence, and affirmed that the "flues" in the notice were the flues of these very sun-burners; maintaining also that the district surveyor would not be justified in excluding these sun-burners from the limits of the notified operations, even if the term "flues" were not to be so understood. On the contrary, one notice was enough for the work as a whole, no matter how many tradesmen might happen to be employed upon portions of it; inasmuch as the purpose of the notice was no more than to direct the district surveyor's attention to the fact that operations were going on. The learned counsel then went into various secondary questions, such as the drawing of the notice by the clerk of the District Surveyor, and the special conditions of the penal clause under which these proceedings were taken; contending also that the sun-burners were but fixtures, supplied rather than executed by the defendants, and their relation to adjacent woodwork being left to the carpenter, his clients making it a rule to do none of the trimming and other cutting away or preparation as regards the structure of the house.

The District Surveyor had no reply, as there had been no witnesses called for the defence; and when Mr. Sleigh suggested that the architect of the work was present to answer any question, and the magistrate reminded him that he would allow the District Surveyor to reply, he declined to call the witness.

Mr. Knox gave immediate judgment; in the course of which he recapitulated the well-known principles by which the law was understood to govern such questions generally. Finally, he considered that the District Surveyor could not legally call upon one tradesman to remedy the errors of another who was not a subcontractor; but at the same time he could not see his way to the ultimate result of perhaps a large number of separate tradesmen being charged each one a separate fee, for so many were portions of one operation of building. Therefore he would not undertake, in dealing with a case of the present description, to lay down any broad principle whatever; but must confine himself to the conditions of the particular case, according to what might be his impression of the evidence before him. Looking, then, at the case in hand, and taking care not to draw any hard and fast line, he thought the District Surveyor admitted having received all necessary notice so far as to direct his attention to the operations that were going on. There had been no sort of concealment for which to punish the defendants; the terms of the builder's notice as regards the use of the word "flues," and the drawing of this notice by the clerk (which he should not advise to be done in any doubtful case), were elements to be considered; he also understood that the more important part of the fixing of the sun-burners belonged to the general builder (who, he thought, as matter of fact, could be held responsible to the law somehow), and that the defendants did little else than supply the apparatus; and, on the whole, in this present instance, he would dismiss the summons.

Mr. Sleigh applied for costs.

Mr. Knox said certainly not. The District Surveyor was perfectly justified in the course he had taken.

The District Surveyor asks us to add the following note, with which we fully agree:—

The impression left upon my own mind is that this must not be taken as a leading case, and that the learned magistrate seemed unusually anxious to guard against such a conclusion. Looking at the increasing use of "sun-burners," and the extremely dangerous character of the apparatus if injudiciously applied, I cannot help thinking that the time has come when their regulation under the Building Act must be fairly considered. It is to be borne in mind that the invention has come into use altogether since the date of the Act; and that the clause which is supposed to apply (as to pipes for conveying heated air) was really directed at nothing of the kind. It is the misfortune of district surveyors that every question they raise is sooner or later interpreted to be one of fees. This they must bear with; but the real question here is obviously enough one of responsibility, and that of no merely nominal kind. One gas-engineer says of another that his sun-burners are only prevented by a miracle from setting the house instantly on fire: the other returns the compliment. I am willing to believe both; and I have humbly submitted that in dealing with such engines of possible disaster, the responsible public officer (if he is to be responsible) ought to have one of two securities,—either that the general builder shall distinctly endorse the safety of the apparatus, or otherwise that the gas-engineer shall take the responsibility upon himself, and account to the law personally for his work. In such a case as the present, if the "notice" be taken as a notice to the public officer of his responsibility for the work notified, then if the gas-engineer gives no notice at all, and the builder very properly declines to admit the gas-engineer's work gratuitously into his notice, on whom is the responsibility to a coroner's jury to rest? If I were the gas-engineer, I think I should be particularly desirous to get rid of it. All the while, I desire it to be understood that, as regards the argument of the learned magistrate, I cannot help admitting the strong common sense which it displayed.

R. K.

ZINC ROOFS.

SIR,—In reply to "Engineer," we beg to state that we do not think there is any composition which will *effectually* prevent rain getting through roofs in consequence of the zinc cracking.

The only remedy is to have the roof taken up and laid upon proper principles, allowing for contraction and expansion.

No doubt "Engineer's" roof has been laid by some inexperienced workman, the joints being soldered, &c.; and we again beg to state that we do not think there is any composition which will *effectually* prevent the rain coming through.

J. W. TYLER & Co.

CHARLES I.'S WATCH.

SIR,—In answer to the query about the missing watch of King Charles I. in your last number, under the heading "Anthologia Technica," the following might, though not very probably, lead to its discovery. Several friends of mine, natives of Battle, say that some years ago a watch and bloody shirt, bequeathed by King Charles to Earl or Lord Ashburnham, were kept in a case at Ashburnham Church, near Battle, Sussex, and exhibited by the sexton; but on the last occasion of exhibiting them, they or the watch only was stolen by the servant of the persons who were viewing them. I cannot learn that it was ever recovered.

R.*

SIR,—In answer to your correspondent, one of Charles I.'s watches was in the possession of the present descendant of Sir Thos. Lucy, at Charlcote Hall, and was stolen from thence when the hall was broken into by burglars some few years ago.

S. COOKE.

ROSSO ANTICO MARBLE.

SIR,—In your number of the 1st of January, you report some observations I made on this subject, at the meeting of the Royal Institute of British Architects, on the 1st of November last year. You correctly quote an erroneous reference I made inadvertently to Rondelet, and which I am anxious to correct. The columns in the Salle d'Apollon, in the Louvre, are not of Rosso Antico, but of red Oriental granite.

THOS. L. DONALDSON.

OLD BOND-STREET GALLERY.

WE are asked to mention that a number of gentlemen, exhibitors and others, connected with the former and present exhibitions held here, considering that there is a want of a Permanent Gallery to replace the late British Institution, in which artists, whether members or not of existing societies, can send their works for exhibition and sale, have formed a committee to bring this about. They consider their opinion borne out by the fact that 2,000 pictures were sent to the first summer exhibition, which opened on June 10th; and for the present winter season upwards of 1,800 were received. Further, that 10,000 persons visited the Gallery in the summer season, and that a large proportion of the pictures were sold. "During the present exhibition, although only open a month, and that the dullest in the year, when the majority of picture-buyers are absent from London, sixty pictures have been already sold." It is proposed to hold three exhibitions yearly of paintings in oil and water colours, to take place in the spring, summer, and winter seasons; and they wish it to be understood that neither rivalry nor antagonism is intended to any existing institution or exhibition. In order to aid in carrying out the proposed exhibitions, it

* Parry's "Coast of Sussex" says,—The north chancel of Ashburnham Church, Sussex, contains the monuments and the memorials of the execution of Charles I., which were bequeathed by Bertram Ashburnham, in 1727, to the parish clerks for ever. These are kept in a glass-case, lined with red velvet, and have nothing in the least repulsive in their appearance. The extremely fine linen excites astonishment from being as perfectly fresh as if new. The shirt of the unhappy monarch has fine ruffles at the wrist, which have faint spots of blood; the drawers are knit of white silk; there is also the Holland sheet thrown over his remains after death, and his watch; this has an enamelled case, and flowers worked on the dial, and is of the old turnip shape. A Mr. Ashburnham contrived the escape of Charles I. from Hampton Court.

has been resolved to form a guarantee fund, so as to cover the yearly rent and expenses in case the sums taken for admission, the sale of catalogues, and commission on the sale of pictures, are not sufficient for that purpose.

Mr. G. F. Chester and Mr. J. W. Benson are the honorary secretaries.

CHURCH-BUILDING NEWS.

Brighouse.—St. James's Church is now nearly completed. It is built in the Gothic style of architecture, and originally was intended to have a tower and spire; but as this would entail a large additional cost, the project was abandoned, and designs made for a lofty bell-turret, at the western end. The turret has a crocketed gable, with double crocketed pinnacles at each side, and surmounted by a stone cross. The turret contains two bells, one 18 in. and the other 20 in. across the bow, which are the gift of some well-disposed friend of the church, and from the foundry of Messrs. Mears & Stainbank. The west window, which faces the turnpike road, contains tracery work, and will be filled with grisaille glass, from Messrs. Lavers, Barraud, & Westlake. Medallions are introduced, with full-sized heads of the four evangelists, and the four major prophets. The east window is left entirely plain, that part of the church not yet having met with a friend so liberally disposed as to adorn it with stained glass; its stone work, however, deserves to be better treated. The church is divided into nave, north and south aisles, chancel, and organ chamber, which latter opens both into the chancel and nave. The nave is 48 ft. to the ridge, 69 ft. long, 22 ft. wide; north and south aisles 10 ft. 3 in. wide. The chancel is well proportioned for the size of the church, and is 28 ft. long, 18 ft. wide, and 39 ft. high. The chief feature in the interior is the chancel arch, which springs from carved capitals. The nave is divided from the aisles by arcades of five arches on the south side, and four arches on the north, the remaining bay of which is appropriated as porch. The arrangement of the doors is intended to prevent cross draughts of air. Subsequently to the drawing of the designs it was found advisable to construct a choristers' vestry, beneath the vestry proper, access to the chancel being obtained by an outside staircase, covered with a pent-roof. The choir will be supplied with oak stalls with carved finials, the prayer-desk occupying the western stall on the south side. Designs, we are told, are about to be carried out for decorating the east wall of the chancel in colour-work; the Decalogue, Creed, and Lord's Prayer being painted on each side of the window, surmounted by tabernacle work. The centre compartment will supply the place of a reredos, which is all that is necessary to render the chancel complete. The pulpit is of Caen stone, circular in form, and supported on a red marble column. There will be seat-accommodation for 600. The pews are of deal, stained and varnished, and open. The heating apparatus has been carried out by Messrs. Thornton, of Huddersfield. The western wall adjoining the turnpike-road is of dressed stone, and the railings, entrance-gates, and gas standards are of wrought iron, the work of a townsman of Brighouse.

Kellington. — The old church at Kellington is now re-opened for service, after undergoing a complete restoration. The north aisle, which was very much dilapidated, has been pulled down and rebuilt. The whole of the old seating has been removed, and is now replaced with open pitch-pine seats. The south chancel wall was found to be so much out of plumb that it was considered unsafe to carry the new roof, and it has therefore been pulled down and rebuilt, carefully preserving the position of the three Early English windows. The east wall of the chancel has been also pulled down and restored, and filled in with a geometrical traceried window of five lights, and the gable on either side is flanked with carved and crocketed pinnacles, with their bases resting on buttresses. The porch and north chapel have also been restored, and the roofs of the nave and north chapel, which were found to be of beautifully moulded ribs in oak, with curiously carved bosses at the intersections, have also been restored, preserving the character of the old work, and using up, wherever practicable, the old materials in their original position. The chancel roof is entirely new, with hammer-beams and open traceried spandrels and moulded ribs. The north chapel and vestry are separated from the chancel with open traceried oak screens, and the stalls for the choir are also of oak, moulded ends and carved poppyheads. The plaster and whitewash have been cleaned off the internal walls, and the whole has been pointed. The chancel arch is new. The carved work was executed by Messrs. Farmer & Brindley, of London. The architect for the restoration was Mr. W. H. Crossland, of Leeds and London; and the work has been executed by Messrs. Kassell, of Goole, at a cost of about 2,600*l.*, the whole of which, we understand, has been presented by a single individual. The stone used in the ashlar work was from the Steetley and Ancaster quarries; and the roofs are covered with the old lead, which has been recast for the purpose.

Hulme (*Manchester*).—The Church of St. Stephen, City-road, Manchester, has been consecrated. St. Stephen's, the foundation-stone of which was laid in August, 1868, by the Earl of Ellesmere, is seated to accommodate 750 persons, and has cost about 5,000*l.* The ground-plan of the church is oblong in shape, rather wider at the eastern than at the western end, by reason of the shape of the site. The north-east (or what would be the north-east if the building orientated correctly) is the principal external view. The eastern elevation comprises a lofty chancel gable, rising more thon 60 ft. from the level of the street, and containing a brick and stone window, about 30 ft. high by 15 ft. wide. Below this window is a brick arcade. The lower part of the wall is banded with coloured brick. On each side of the principal one are the two gables of the chancel aisles; that to the north having two stories of windows; the choir vestry being upstairs. In the north aisle, each bay is gabled transversely, and in each is a three-light window, with moulded brick and stone tracery. The clearstory is seen above the aisle roof. The upper part of the west end is set back 6 yards, and carried on arches; so that while all the available space is reserved for sittings, the main west gable may not too closely overhang the schools adjoining the church. This main west gable is pierced by two three-light brick windows, with a rose of stone tracery above about 8 ft. in diameter. The distance from east to west being short for a church of this size, the nave and chancel roofs are kept the same height, and over the chancel arch is a lead-covered and crocketed belfry, rising nearly 90 ft. from the pavement, and containing a bell by Mears. The exterior of the building is mainly of brick; some of the bricks are moulded, and some used in diapers and arcades. All the gables, eaves, and cornices are brick, stone being used only for the tracery of windows, and where it is constructionally required. Underneath the large east window facing City-road is the inscription, in Minton tiles, "In this place will I give peace, saith the Lord of Hosts." The principal entrance door is deeply moulded in brick, with stone imposts. The lower part, being liable to injury, is plainly bevelled only. Besides this door on the north, there are for exit two others, one at the east and another at the west end. The chancel fittings are of pitch pine and walnut. The arches of the north and south chancel aisles are filled with ornamental wooden screens, with tracery in the upper, and panels and balusters in the lower part. The east window is the work of Messrs. Heaton, Butler, & Bayne. The central subject is the Ascension, and subordinate to this are several incidents from the life of St. Stephen. The wall space below the east window is covered with panels of diapered plaster work, in relief. In the centre, above the Lord's table, is a cross, formed of light and dark alabaster. Immediately over the table is the inscription, "The Word was made flesh." The chancel is lighted at night by rows of gas-jets on the tops of the wood screens; the nave and aisles by coronæ hung from above the apex of each arch. These fittings are by Messrs. Thomason & Co., of Birmingham. The glazing generally (which is by Messrs. Edmundson) is in simple tinted quarries, with slightly ornamental work in the tracery, &c. The blank wall of the south aisle—which, owing to the proximity of adjoining buildings, has no windows—is to be relieved by panels containing the Beatitudes. The gallery is in a recess at the west end, so as not to intrude into the church. The nave arcade runs round in front of this gallery. Below the great west window is a medallion, sculptured by Mr. W. Green, representing the martyrdom of St. Stephen. There are to be four other medallions, with lessons from the life of St. Stephen, in the triangular spandrels of the nave arches. It is intended shortly to decorate the church to a moderate extent with colour. The heating apparatus is by Messrs. Haden. Besides the subcontractors under Messrs. Ellis & Hinchliffe, P. Hodkinson, and W. Clark, there have been thirteen or fourteen different tradesmen employed on the work. This church completes Mr. Birley's work in this district — he having previously built the schools, parsonage, and schoolmaster's house. The architects were Messrs. Medland & Henry Taylor, of Manchester.

DISSENTING CHURCH-BUILDING NEWS.

Leicester.—The Presbyterian Church here has been opened. It will accommodate nearly 800, and is provided with suitable vestry accommodation; the ground on the north side of the building being reserved for the erection at a future time of a school-room, which will closely adjoin the church, and have a frontage to the London-road. The design is in the Early English Gothic style; the walling externally being of rock-faced Bulwell stone, and the dressings of Bath stone. The principal front, that next London-road, has a large five-light geometrical traceried window, with engaged shafts in the mullions; and underneath, the principal entrance door, which has a double recessed and moulded trefoil arch and detached shafts, with moulded caps and bases. At the south-west angle of this front are a tower and spire, the tower having in its principal stage four long lancet windows. The spire rises to a height of 120 ft., and is finished with an iron cross. The side elevations of the church have each five bays of two-light windows two tiers in height. The upper tier is traceried. Internally, the church is galleried on three sides, the side galleries being supported by large iron columns, which also support the main timbers of the roof. The principal roof-timbers are exposed to view, and stained and varnished; the panels formed by intersections being plastered and decorated in colour. The cost of the building will be about 3,000*l.* The contractors for the builder's work were Messrs. Osborne, Brothers, of Leicester. The gasfitting is being executed by the Leicester Gas Company. The church is heated by Blake's patent hot-air apparatus. The architect was Mr. Tait, of Leicester.

SCHOOL-BUILDING NEWS.

Ardwick (*Manchester*).—The foundation-stone of the new schools which it is proposed to erect in connexion with St. Thomas's Church, Ardwick, has been laid. The site of the new buildings is a rectangular plot, bounded by four streets, at the rear of the church. The building, which is two stories high, is of a Gothic character, with picked common brick facings and Darley Dale stone dressings. Over the window heads are slightly sunk panels, the arches being formed with moulded stock bricks. The north front has a range of six windows to each floor, the lower being three-light, and the upper two-light; in each there is a casement to open for ventilation. The upper windows have projecting gables supported on moulded brick corbellings, continued along the eaves. In the east elevation there is a stone traceried rose window, giving light to the upper floor. In the west elevation is the bell-turret, which rises perpendicularly over the large three-light window to the principal staircase. The building has a frontage to Paddock-street of 88 ft., and a depth of 39 ft. On the ground-floor is the infants' school-room, 54 ft. by 36 ft., and 16 ft. high, and two class-rooms, respectively, 23 ft. by 14 ft. 9 in., and 16 ft. high; and 17 ft. 8 in. by 14 ft., and 10 ft. 6 in. high; also a lavatory and cloak-room, 13 ft. by 14 ft. From the entrance to the infants' school-room there is a staircase leading to a committee or class room, 31 ft. by 14 ft., which forms a mezzanine floor between the ground-floor and the gallery of the upper floor; this staircase is continued to the gallery. The principal entrance to the first floor is from Thomas-street, by a stone staircase, with oak handrail, and ornamental iron ballustres. This floor comprises the boys' school-room, 69 ft. by 36 ft., and a class-room 23 ft. by 15 ft.; the height to ceiling being 21 ft. 9 in.; the roof principals are in red deal, stained and varnished, and have hammer-beams and brackets springing from moulded stone corbels. In the basement there is a kitchen, 27 ft. by 14 ft., with range and boiler, and the usual conveniences for the preparations for tea meetings. In addition to open fireplaces in each room, the building is warmed by Messrs.

Whittaker & Constantine's hot-air apparatus placed in the basement, the heated air being conveyed to the school-rooms by means of flues and shafts. Provision has also been made for carrying off the vitiated air by shafts from the various rooms. The building has been arranged for the accommodation of 300 infants, and 250 boys. Adjoining are play-grounds asphalted and drained, and the usual out-offices. The total cost of the works, exclusive of furniture, will be 2,400*l*. The drawings have been prepared by Messrs. Royle & Bennett, of Manchester, architects, and the works will be carried out under their immediate supervision. The contractors are Messrs. Thomas Clay & Son, Audenshaw.

Books Received.

The Church Seasons Historically and Poetically Illustrated. By ALEX. H. GRANT, M.A. London: Jas. Hogg & Son.

IN this volume readers will find traced the origin and history of the Festivals and Feasts of the Ecclesiastical Year, with notices of the principal ideas and doctrines they incorporate. Many poetical references to the various days are quoted. It includes the results of a good deal of careful reading, and will, doubtless, interest a considerable circle.

VARIORUM.

"After Office Hours" (Morgan & Chase, Ludgate-hill) is a brief statement of a year's work carried on in Christian mission to the costermongers and the free school, Golden-lane, London, under the superintendence of Mr. W. J. Orsman. Good work is being done here and deserves help.——The *Art Journal* begins its new volume with an illustrated account of Hardwick Hall, one of the series of papers by Mr. S. C. Hall, headed "The Stately Homes of England." Incidentally, Mr. Hall mentions that at Shirland hard by, neither the sexton nor his father and grandfather before him had ever seen the *rector of the parish*. Mr. Edward Hulme gives the first of a series of papers on the Adaptability of our Native Plants to Purposes of Ornamental Art, with which he is well qualified to deal.——"A Handy-book of the Law of Masters and Servants, by H. F. Gibbons, LL.B., Cantab., Barrister-at-law. London: Tegg." In this useful book are shown the rights, duties, and liabilities of the parties to the contract of hiring and service, with the decisions on the subject, and an index to all the statutes regulating labour, and relating to apprentices, carried down to the year 1869. It is not intended, however, so much for a popular exposition of the law as for a handy-book of reference to be used in legal proceedings in the inferior courts, where the more expensive text-books are not to be procured. The work, therefore, only gives a general outline, showing the principles on which the law rests. ——"A Manual of Bankruptcy and Imprisonment for Debt, under the Acts of 1869. By G. M. Wetherfield, solicitor. Longmans & Co." An epitome of the law under these statutes is here given in untechnical language, with a comparative table showing the changes made by the new Act.——"Waste Labour to Waste Land. A special Plea." The object of this tractate, issued by the Committee of the Industrial Employment Association, Parliament-street, is to show how immediate and remunerative employment may be afforded to the masses; so preventing pauperism and crime; rescuing and protecting the young; and rearing up a healthy, virtuous, and self-reliant population. This it is proposed to do by a comprehensive adoption of the policy of applying "waste labour to waste land," and a practical realisation of the motto that "prevention is better than cure," though the latter is not to be ignored or neglected. No season could be more appropriate than the present for bringing such a scheme vigorously before the notice of Government, the Legislature, and the whole public. The object in view has our sympathy and our best wishes for its successful accomplishment.——"Employment. Farrah: Strand." This tractate proposes another scheme for employing the unemployed, not on waste lands, but on public works, including, however, land reclamation and drainage, as well as embankments, harbours, sewers, town-halls, hospitals, winter gardens, public parks, swimming lakes, &c. &c. The workmen are to contribute their labour voluntarily, as the rich contribute their means for the promotion of such works; but the workmen to be provided with fitting lodging, food, &c., under a system of management appointed by Government!——"The Swimming Baths of London. By R. H. Dudgeon, M.D. London: Turner & Co., Fleet-street."—This pamphlet gives an account of the swimming-baths of London, showing that they are defective in some respects; and that there is a great want of open-air swimming-baths, which might be supplied by utilising a portion of the water in five of the existing parks, as well as in the formation of new parks. Swimming-baths for ladies Dr. Dudgeon includes in his desiderata, and shows how they could be arranged.

Miscellanea.

Fall of a House in Limerick.—During a recent hurricane the different dwellings in the Irish and English Towns, Limerick, which, for the most part, are ancient, and teem with inhabitants, suffered severely, chimney-stacks having been blown down, and several roofs taken completely off. The wretched dwelling where the accident occurred is a four-story house, situated at the corner of Halles-lane, at the rear of St. John's parish church, and for a considerable time it has been in a most dilapidated condition, the back of it partly upheld by props of timber. Nevertheless, from the garret to the basement story every room was crowded with its living freight. The poor people, being accustomed to the rocking of the old dwelling, did not think there was any danger, and continued in their rooms, till, in one fearful crash, the entire of the rear fell in, burying in a mass the unfortunate occupants. Aid having been rendered more than twenty people were removed from the *débris* and immediately conveyed to Barrington's hospital. Some of them were very severely crushed, and upon further clearing away the bricks and mortar the bodies of five unfortunate individuals were discovered beneath, and the body of another, that of a woman, who is known to have occupied the ground-floor, still remained among the ruins.

The Bristol Theatre Disaster.—At the close of the inquest, the coroner having summed up, the foreman said the jury fully concurred in the opinion of the coroner that they could return no verdict but that of "Accidental death." They exonerated Mr. Chute, the manager, from all blame in the matter, but they regretted that those in charge of the doors had not the forethought or presence of mind to open them when the pressure began. They thought that by so doing the disastrous results of the calamity might have been lessened, if not averted altogether; but they believed it was the impatience and eagerness of the public themselves to gain admission that contributed mainly to the accident. The jury also wished to express in the strongest terms their condemnation of the present mode of entrance, thinking that from the steepness of the incline, and the rough nature of the ground, it was unfit for the entrance of three-fourths of the people who frequented the theatre. They believed that the accident was very much increased in consequence of the cross-stream of persons, mentioned by Mr. Hall, gaining an entrance, some to the pit and some to the gallery, and they fully concurred in the recommendation made by Mr. Hansom, that two entrances should be made, with a passage between for the policemen.

Appeal for an Artist.—Mr. Herbert Smith, an artist of considerable merit, and of the highest character, has been suddenly struck down by paralysis, and entirely deprived of the means of supporting himself and family. A committee of gentlemen has been formed for the purpose of setting on foot a scheme for the help of the unfortunate artist, who will probably never again be enabled to resume his labours: it is proposed to devise some plan, by which he can be relieved, through the sale of his unsold pictures, by means of a sort of art-union. Mr. Charles Mercier, of 21, Albert-gate, would give information.

Free Library at Doncaster.—A new free-library for Doncaster has been opened with considerable ceremony in the building which was formerly the grammar school of the town. The library has been formed by the gift of the books of the Subscription and Mechanics' libraries, and volumes have also been presented by gentlemen resident in the district.

The Proposed Darien Canal.—The opening of the Suez Canal has given a stimulus to the kindred proposals, now of many years' standing, to cut asunder North and South America by a similar ship canal across the Isthmus of Darien, or of Panama. A concession, it seems, was granted, years since, to the Société Civile du Darien by F. de Francesco Martin, minister plenipotentiary of the Confederation, appointed to contract for a canal from San Miguel Bay to Caledonian Bay, in accordance with a law passed on May 28th, 1859. The contract with the Société Civile du Darien is said to have been signed on December 10th, 1860; and the concession is declared to be still valid. If we mistake not, there is also a concession for a canal at Panama in the hands of United States men. The experience and knowledge of the subject possessed by Dr. Cullen, who wrote in the *Builder* some years ago as to the proposed routes, might now be of service in the promotion of the great end in view. The work will be a more difficult one, we fear, than the cutting of the Suez Canal, considering the mountainous nature of the district, and its frequent disturbance by earthquakes.

Mansion, Wargrave, Berks.—A mansion has just been erected in white brick and stone, on the summit of a hill, some 300 ft. above the Thames, which it overlooks for miles. It has a stone portico of eight columns, with pediment. A pair of folding doors enters the vestibule, leading to the inner hall, which, with its columns on each story, its coved and enriched panelled ceiling, and embossed and stained glass light over, has a good effect. The drawing-room is 50 ft. by 20 ft., and has two bay windows, the views from which are very fine. The accommodation includes dining-room and morning-room, each 27 ft. by 19 ft.; billiard-room, 34 ft. by 19 ft.; library, 19 ft. by 19 ft. There are seven best bedrooms (all 12 ft. high), besides dressing and bath rooms, lavatories, &c., and the usual servants' offices. The walls are all built hollow in cement, with iron ties, in the hope of ensuring dryness. Messrs. Pennington & Bridgen are the architects, and Mr. J. R. Ashby, of Henley, is the contractor for the whole of the works.

Meeting of Government Science Teachers.—A meeting of Government science teachers has been held at the Manchester Mechanics' Institute, to consider the recent minutes of the Department of Science and Art in relation to science teaching and Government payment to science teachers. Mr. John Angell was in the chair. The following resolutions, with others, were unanimously carried:—

"That this meeting hereby expresses its regret and disappointment at the sudden and unanticipated mode in which the Department of Science and Art (without previous consultation with the various science teachers, who, under the direction and in faith of its guarantee, as announced in its 'Science Directory,' issued in September last, accepted, during the months of September, October, and November, lecturing engagements terminating in May next) repudiated its engagements with the said teachers, such repudiation being contained in the minutes dated respectively November 30th and December 13th, and posted December 4th and 15th." "That this meeting hereby expresses its opinion that in all cases where teachers have accepted engagements for the current session on the faith of the instructions and guarantee of the Department of Science and Art, it is honourably bound to fulfil those engagements, subject to alterations adopted with the concurrence of the said teachers."

The chairman and secretary were requested to put the resolutions in the form of a memorial, including the names of teachers present, and transmit the same to the Department of Science and Art.

A Public Library for Islington.—A meeting was held on Wednesday evening, in the Parochial School-room, Liverpool-road, to consider the propriety of applying the provisions of the Public Libraries Act of 1855 to the Islington district. Mr. Savage, the representative of the district at the Metropolitan Board of Works presided. Mr. Lucraft moved a resolution in favour of the adoption of the Act. Mr. Smithies seconded the resolution; Mr. Elt opposed it. After discussion the motion was carried by show of hands—76 to 66.

A Complimentary Supper.—Messrs. Wright & Mansfield, decorators, entertained the workmen of the various branches of their establishment, about 200 in number, at Supper at the Eyre Arms, St. John's Wood, on Saturday evening last. The chair was taken by Mr. Wright, the senior partner, supported by Mr. Mansfield and friends. Various toasts were drunk, and much good feeling shown.

Iron-Plated Forts: Fort Cunningham. The first experiment in iron forts has been made by the construction of Fort Cunningham, for Bermuda, at the Atlas Works of Sir J. Brown & Co., Sheffield. The faces of the fort present an iron wall, 14 ft. high and 150 ft. long, pierced for seven great guns. The fort contains seven complete casemates, in each of which a great gun may be worked. The front wall is made up of three thicknesses. The face is of 5-inch armour-plates, arranged horizontally. Behind them stand upright a row of massive iron beams, each measuring 16 in. by 5 in. Then comes a third mass of iron, composed of thick iron beams laid horizontally, excepting at the port-holes, where there are four thicknesses of armour-plates. From face to back this wall is held together by a number of strong bolts from the outside to the inside, the bolts being made tight by nuts and screws. When permanently fixed the interstices between the plates and the beams will be filled in with iron concrete, so that the wall of the fort will be one solid mass, about a yard thick. This iron wall is supported at short intervals in the rear by heavy upright beams, 12 in. by 5 in., and near the port-holes these beams have an increased thickness. The face of the fort weighs over 700 tons. The space behind for the guns, the gunners, and their ammunition is covered by a bomb-proof roof. The total weight of this work is 1,000 tons, and its cost about 30,000*l*.

The Steam Omnibus at Edinburgh.—Nairn's patent steam omnibus is similar in appearance to one of the largest horse omnibuses. It has only three wheels, however, of 3 ft. in diameter, and these are solid and of wrought iron, with willow-wood tyres. The power is communicated through the two hind wheels, and the vehicle is steered by the front wheel. The boiler is in front, and the vapour from the furnace passes along beneath the seats outside to the hinder end, where it passes out through a short horizontal funnel above the conductor's head. There are arrangements for preventing the heat from incommoding the passengers, either inside or outside. The vehicle accommodates fifty passengers, and the engine is of six horse-power. The speed can be increased up to twenty miles an hour if desired. The cost is about that of a horse omnibus with the horses. These particulars are given by the patentee, Mr. Nairn, of Leith.

Utilising Waste Heat.—Mr. E. Crowe, of Middlesbrough-on-Tees, employs a boiler of two horizontal tubes arranged one over the other, and connected by a number of upright tubes arranged at short distances apart along the horizontal tubes. The water-line of the boiler is at the diameter of the upper tube or thereabouts, and the boiler below this line is inclosed in a chamber of brickwork, into which, at one end, the products from the furnace enter, and which, at the other end, is connected with the chimney, so that the chamber is, in fact, the flue of the furnace. The sides of the chamber at the level of the vertical tubes are corrugated so as alternately to approach and recede from the vertical tubes, so that the draught is caused to pass in undulating direction. This causes it to impinge more effectually on the vertical pipes, and at the same time sufficient space is obtained for a man to pass through the chamber to clean it from time to time.—*Mechanic's Magazine.*

Explosion of a Kitchen Boiler in the North.—No winter passes without the occurrence of a calamity caused by the explosion of a kitchen boiler in the north of England, through the water in the pipes leading to it freezing, and then, on thawing, rushing suddenly into the heated space. An accident of this nature has occurred in the village of Didsbury, about five miles south of Manchester. The boiler formed part of the kitchen range, and had a feed-pipe communicating with a bath in the room above. The boiler suddenly burst with terrific force. The windows and doors were burst open, and, in addition to fragments of the boiler, fire, and brickwork of the grate being projected into the room, part of the ceiling was brought down. One woman was killed, and another much burnt and scalded.

Reduction in the Price of Metropolitan Gas.—The Imperial Gas Company have given notice to their customers that from the 1st inst. the price of gas supplied by them will be reduced 3d. per 1,000 ft., viz., from 4s. to 3s. 9d.

Agriculture.—Mr. Mechi has been lecturing recently on agriculture to the members of the Framlingham Farmers' Club. Mr. Mechi argued that steam power had so multiplied population, by affording increased and more profitable manufacturing employment, that we were no longer in the primitive pastoral period, when the people were few and the acres were many. In 1800 the population was 10,000,000, while the number of acres available for agricultural purposes was 45,000,000. In 1869 the population had increased to 32,000,000, and the number of acres remained at 45,000,000. The hungry millions of the manufacturing districts now demanded from agriculturists a change of practice. He considered it a disgrace that, wanting 10,000,000 quarters of foreign wheat annually, we permitted one half of our acreage to remain in primitive pasturage.

Effect of Exposure on Glass Windows.—We know that the surface of glass which contains soda undergoes considerable change after a lengthy exposure to the air. Bluish glass undergoes no such alteration; but that which has originally a greenish tinge becomes brown after a time; whilst very pure white deteriorates rapidly, showing first a yellow, then a brown, and finally a violet film. *Nature* says,—At this season of the year we do not require this additional colouring to the appearance of our already discoloured atmosphere. It has been noticed that some modern stained glass on a foggy day has almost the richness of the ancient. We need not go far for a solution of this. The old glass has acquired in the course of ages a film which takes the place of a permanent fog, especially on those colours which, like the ruby, are formed by a thin coating of the coloured glass on a thicker plate of transparent metal.

Disinfection.—Dr. Lankester, medical officer of health, has made a report to the Vestry of St. James's, Westminster, in which he states that inquiries have been made as to whether they possess any disinfecting apparatus in the parish, and suggesting that several contiguous parishes might join in erecting a common disinfecting apparatus, such as the 23rd clause of the Sanitary Act of 1866 permits every vestry to erect in the parish. He says that a disinfecting chamber could be erected in the stoneyard of the workhouse, into which steam from the baths and washhouses might be laid on for disinfecting clothes, and which might be open to the use of the whole parish. No action has been taken by the vestry in the matter.

Birkbeck Literary and Scientific Institution, Southampton-buildings.—The 184th quarterly report of this institution shows that so great has been the increase in the number attending the evening classes, that it has become necessary to construct larger classrooms for the accommodation of the students. These will shortly be completed. Earl De Grey and Ripon has consented to preside at the annual distribution of prizes, on Wednesday, February 9th. Sir Joseph Whitworth has placed at the disposal of the institution one of the exhibitions which he has founded for the encouragement of mechanical science.

A Newington Guy Faux.—The other day a committee was appointed to inspect Newington vestry-hall, and in one of the strong rooms they discovered a large number of post-office directories, "Kemp's Outlines of Sermons," and a treatise on personal godliness. The floor was covered with rate-papers, under which were loose lucifer matches. The latter ignited beneath the tread of the committee, and the premises had been in the most imminent danger of destruction by fire. The *Parochial Critic* which communicates the incident adds,—"These facts are not very eloquent in praise of the shrewdness and ability displayed by the Newington authorities in selecting their servants."

Worcester Cathedral.—The new bells for Worcester Cathedral, which were founded at Loughborough, are now deposited in the north transept preparatory to their elevation. They are thirteen in number; twelve of them will ring in peal, and the thirteenth is the semi-tone bell required for the Westminster chimes. About 3,000*l*. have been raised by public subscription to defray their cost. They vary in weight from 6 cwt. 3 qrs. 19 lb. to 50 cwt. Each bell is ornamented with a band of Gothic work, and the name of the Apostle after whom each bell is named is inscribed on the waist of the bell in letters of the fifteenth century. The total weight of the bells is 221 cwt. 3 qrs. 22 lb.

Memorial Brass.—Mr. J. G. Waller has just now completed a Brass in memory of the late Mr. George G. Kennaway, M.A. It is a portrait of the deceased in M.A. gown, and is inlaid in black Belgian marble. It is placed in Wynard's Chapel and God's House in Exeter, founded 1420, for poor people. The chapel had been restored by deceased, and endowed with land, and of this the figure holds a plan, together with a model of a building. The figure is about 5 ft. long, the usual size of old brasses. The model, although conventional, has details, such as a bell-turret, taken from the building. It has been executed under the supervision, to some extent, of the Rev. H. T. Ellacombe, and may be regarded as a very satisfactory work.

Hydraulic Cement.—An improved cement, which perfectly resists the action of water, and is designed for the ornamentation of buildings, has been proposed by M. J. A. Dubus, of Paris. The principal component parts are lime, silica, and alumina, the two latter being extracted from refractory clays. In order to bring about the formation of the double silicate of lime and alumina, sulphuric and boracic acid are added in small quantities. The proportions of the constituents are varied, according as the cement is required to set slowly or quickly. The proportions of the substance in the anhydrous state are—fat lime of first quality, 67·96 to 74·65; refractory, 27·18 to 42·89; sulphate of lime, 4·76 to 9·06; and boracic acid, 0·10 to 0·40.

The Memorial of Faraday.—The funds for the Faraday Memorial have reached 14,000*l*. There is now some prospect of the speedy erection of a statue of the philosopher which shall be worthy at once of himself and of his country. The committee should get the best possible advice.

Sculpture for Bolton Town-hall.—The Town Council of Bolton have decided, by a majority of 26 votes to 9, to adopt the model sent in by Mr. Calder Marshall, for the decoration of the tympanum of the new Town-hall, at a cost of 1,000*l*. There were five competitors.

Conversazione of the Institute of the Architects of Ireland.—This Institute held a conversazione on the 16th ult., and the president, Mr. James H. Owen, delivered an interesting address. Mr. John M'Curdy, Sir William Wild, and others, spoke afterwards. The *Irish Builder* reports Mr. Owen's address in full.

Proposed Orphanage and Schools.—Designs for proposed orphanage and schools in connexion with the Rev. Dr. Rutherford's Church, Newcastle-upon-Tyne, have been prepared by Mr. T. Oliver, architect, at an estimated cost of 3,500*l*, for the schools, or 4,500*l*. if united with the orphanage.

TENDERS.

For additions and alterations to St. Mary's Hall, Brighton. Mr. G. E. Scott, architect. Quantities supplied by Mr. B. H. Nunn:—

Griffiths	£1,870 0 0
Chappell	1,750 0 0
Lynn	1,737 0 0
Parsons	1,682 0 0
Cheesman	1,680 0 0
Lockyer	1,653 0 0
E. Nash & Co.	1,590 0 0

For dwelling-house and offices at Kenley, Caterham. Mr. Charles Rutley, architect. Quantities by Messrs. Blackwell & F. Rutley:—

Brown	£2,469 0 0
Peskett & Taylor	2,412 0 0
Jarrett	2,297 0 0
Grover	2,160 0 0
Hunt	2,124 0 0
Nightingale	2,085 0 0
Nash & Co	2,065 0 0
Hearle	2,061 0 0
Harrison & Edwards	1,966 0 0
Salter	1,675 0 0

For vestry and other buildings to St. Patrick's Church, Hove. Mr. Somers Clarke, jun., architect:—

Lockyer	£989 0 0
Bruton	893 0 0
Manwaring	792 0 0
Nash & Co.	745 0 0

For the erection of six cottages at Rochampton, for the Right Honourable the Earl Spencer. Messrs. Beeston, Son, & Brereton, architects. Quantities supplied by Mr. Barnett:—

Townsend	£1,976 0 0
Adamson & Sons	1,896 0 0
Bracher & Son	1,830 0 0
Euston, Brothers	1,779 0 0
Aviss & Co. (accepted)	1,697 0 0

For rebuilding No. 2, Warden's-court, Clerkenwell, for Mr. Henry Robins. Messrs. W. Waymouth, & Son, architects:—

Freedy & Son (accepted)	£564 0 0

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New and Old Masters in Burlington House.

THE noble exhibition of the works of the old masters which has been opened, with the opening year, in Burlington House, the Royal Academy has earned the thanks of students and lovers of the fine arts. Her Majesty the Queen has contributed thirteen pictures, chiefly from Windsor Castle. Eighty-six other contributors, including the Royal Academy, have swelled the total number of the paintings exhibited to 234; among which 152, chiefly of the old masters, include some of the most famous *chefs d'œuvre* of the painter's art.

We regard the exhibition with a feeling not only of satisfaction, but of a just pride, which is but rarely called forth by any attempt to introduce the English public to the regions of high art. It is a matter of honest self-gratulation to find that, without baring the walls of our National Gallery, or of the yearly lengthening corridors of South Kensington, so many pictures, of so high a class, can again be produced from Royal and private mansions. That they should be thus readily and conspicuously brought before the public gaze is a fresh source of satisfaction. Not that, for the most part, they were previously to be regarded as talents absolutely hidden in a napkin; but it is one thing to catch a glimpse at such noble works in a series of pilgrimages made for the purpose, and another to be able to compare them as they are hung, with no little judgment, in the spacious and well-lighted rooms of Burlington House.

We confess that on looking at the catalogue before visiting the Exhibition, we felt no little doubt as to the judicious character of the arrangement. National and chronological assortment are altogether ignored, nor is it easy to see upon what principle it has been ordered that No. 1 should be a landscape by Richard Wilson, and No. 2 a portrait of the Prince of Asturias by Velasquez. But the view of the rooms disarms this anticipatory criticism. Whoever arranged the pictures, and on whatever principle, it has been well and wisely effected; and we cannot recall a single instance of the "killing" of one picture by its ill-assorted neighbours (as was the case with Mr. Bierstadt's noble landscape in the Exhibition of 1869), or of mutual injury to the effect of two neighbouring paintings, which was so painfully and palpably the result of the hanging of the "Astronomers," by Bol, over the contested Rembrandt, in the National Gallery, during the same season.

A still more profound source of gratification arises from the proof afforded by this Winter Exhibition of 1869–1870, of the position of more than one English artist in the very van of the army of painters. Who would have believed, in earlier times, that our cloudy skies had nurtured a genius that could hold its own in the presence of such mighty names as those of the great masters of Italian, of Spanish, and of Flemish art. And yet in a collection containing an easel picture by Michelangelo, paintings, and those of the first merit, by Vandyck, Murillo, Titian, Leonardo da Vinci, Rembrandt, Rubens, and lesser but still brilliant lights, no impartial critic can doubt that Gainsborough bids as high for immortality as either of the older European masters. Our regard must be had to composition, as well as to execution; and it is not possible with perfect fairness to compare a single portrait (such as that of Mr. Beaufoy, No. 105, where the balance of the figure is so perfectly posed that you almost fancy that it moves upon the canvass) with a grand group, such as the "Last Supper," with its powerful effect of love, surprise, and horror running through every figure as if by an electric shock. But apart from the rank claimed by a picture on the ground of its size or complexity, looking only at the power of the artist to bring out into actual life,—and noble, pictorial life into the bargain,—the subject he has undertaken to represent, we question whether any picture in the collection, unless it be the "Good Shepherd" of Murillo, surpasses "The Blue Boy" of Gainsborough, which has been lent by the Marquis of Westminster. One or two glorious portraits are there from the pencil of Vandyck, of which that of Madame de Sainte Croix, lent by her Majesty from Windsor Castle, is the most fascinating. Rubens has shown, in his wonderful portrait of Philip IV. of Spain,—in which the features are preserved, and yet the whole heavy countenance is ennobled and almost etherealised,—wherein lay the great secret of his fame. There is a wonderful "Doge," by Titian, which may rank with the best works of that immortal painter. And yet, in the same room, hung amid works like these, the pictures of Gainsborough hold an equal rank.

Another English, or at least British, artist, who is represented (perhaps fortunately) by only two pictures, takes, in one of them, a position of an eminence that would not have been anticipated. Wilkie's "Columbus explaining the Project of his intended Voyage for the Discovery of the New World, in the Convent of La Rabida," has two characteristics of unusual excellence. The figures and faces are purely and typically Spanish; not less are they undeniably professional. The sparsely-locked figure in profile is a soldier and nothing else; the priest is every inch a monk. The great projector looks down on the chart with the firm self-reliance of a man who saw truth where others only dreamed dreams. The pathognomy of the faces is no less admirable than are their nationality and professional character. The colouring is full and bold, and if we observe some want of patience or of education in the some want of patience or of education in the finish, we yet recognise a great painting, not for an English gallery alone, but for a European one.

We think that less than justice has been done to Mr. Leslie by placing so many of his productions in so lofty and brilliant a neighbourhood. Neither do we recognise his best works in the collection. Had Lord Leconfield's "Sancho Panza and the Duchess" been the only Leslie in the exhibition, the painter, high as he still stands, would have appeared to far greater advantage than he now does.

A very different judgment will be formed with reference to Stanfield. The numerous collection allows the works of that admirable landscape-painter to illustrate one another with great power and beauty, and establishes the right of their author, not only to high rank in his own department, but to admiration as a true poet, seeking expression for his noble imagination by the aid of the pencil. "The Abandoned" (No. 171), a dismasted vessel rolling heavily on a stormy sea, is a perfect poem in itself. The "Mewstone" is another painting of the same order: the calm, cruel gleam of the slanting rock,—the mad vertical leap of the spray which it dashes up,—the whirl and trouble of the waves,—the wrathful sky,—the tossing bit of wreck,—the skimming petrel,—the military line of the strange natives on the rock—half bird and half fish as they may almost be considered,—are elements of a very powerful and successful appeal to the imagination.

Many, perhaps the greater number, of Stanfield's pieces here collected represent small peeps or patches of landscape, and may be considered as bearing the same relation to landscape proper, that portrait does to historical composition. In the broad sweep and long perfection of the one landscape, by Rembrandt, lent by Lord Overstone, there is room, geographically speaking, for a whole gallery of Stanfield's scenes. But each is, in itself, a bit of nature, and often a very perfect bit. It should be remarked that the curse of impotence which seems to hang over any English painter who attempts the historical, has not spared Stanfield. His "Opening of London Bridge" can only be tolerated in virtue of its superiority to the two miserable specimens of "composition," the "Christening of the Princess Royal, at Buckingham Palace," and "The Coronation of Queen Victoria, her Majesty receiving the Sacrament," which recall some of the ambitious failures of poor Haydon. Nor had Mr. Stanfield learned to dip his brush in the colours with which the sun of Italy glorifies the landscapes of which the artist has given us the forms, but not the lines. "The Bay of Naples and Vesuvius," looks strange to eyes that are familiar with that azure sea and that unclouded sky. In the "Island of Ischia," the distant mountain fades with much of the aërial distance proper to the spot; but the nearer parts of the picture are too cold and dead for truth. The glowing imagination of Claude, faded although the tints of his limpid pencil have become, tells a far truer story of the sunny south than the English painter has ever realised. Indeed, it is probable that during the real summer months, in which some of the most picturesque effects of Italian life and scenery are to be noticed, few English painters have endured the heat, with the thermometer above 90°. But set the northern artist to work upon Alpine pass, snow-capped peak, or fir-tufted ravine, and, in depicting the scenes amid which he can breathe without oppression, he fully rivals the Italian master, when he lingers in the golden haze of the Mediterranean summer.

If Stanfield has failed in an attempt at the historic painting of an occurrence which is now some forty years old, a very different criticism must be passed on his illustrations of the wars of 1860. The French, as it is well known, do as much to encourage and stimulate the historic painter as we are in the habit of doing—passively and negatively, indeed, but with perfect success—to snub and extinguish him. We can, therefore, understand how it is that vivid and spirited illustrations of French victories are not far to seek. But we find in this exhibition a proof of the noble contagion of this artistic fire. Only one great English battle is represented among the scenes illustrated in the present exhibition,—namely, Benjamin West's ghastly and dreary "Death of General Wolfe." But Stanfield gives us "The Battle of Roveredo," and "The Passage of the Magra by the French," two military pictures of great power and beauty. The former is, perhaps, more like a manœuvre than a battle, as no consciousness of the hostile presence of the enemy leads the eye from the gunners struggling with their horses in the torrent, up to the puff of smoke issuing from the embrasure; and we arrive at the fact of the defence by chance. But the general effect of the picture is very fine; and in the companion

piece the dark stern cloud that wraps the mountain to the right is instinct with that poetic truth of which this artist so often evinces a thorough perception.

Still looking for English artists, we have two landscapes by Richard Wilson, and two by John Crowe, all dimmed by the lapse of time. Sir Joshua is represented by two academic portraits, one of himself and one of Sir William Chambers (in each of which the original rich colouring is preserved in a manner quite unusual in the president's pictures), and by six other works. Among these the well-known picture of Mrs. Siddons as the tragic muse, may be compared instructively with the Sigismunda of Hogarth. There is more of grace in the former,—more of passion and pathognomical study in the latter remarkable work. But Sir Joshua has given us only the actress; Gainsborough has elsewhere given us the woman,—and a woman of rare and queenly beauty,—in his profile portrait now in the National Gallery.

Passing to the main subjects of the exhibition, the works of the old foreign masters, the foremost interest attaches to the unfinished Holy Family, lent by the trustees of the late Lord Taunton. This is one of those famous easel pictures, attributed to Michelangelo, as to which so fierce a controversy raged last year. It is a grand study. Thus much, we think, no competent critic can deny. The work is by the same artist as the "Entombment" in the National Gallery. That artist was a sculptor, or, at all events, had a sculptor's power of modelling and sense of weight. The character of the female faces, which is not distinctively Italian, of either of the best defined provincial types, is precisely that of the marble head, or, rather mask, in South Kensington Museum, which is considered to be an unquestionable work of the great Florentine. This chain of evidence, hitherto, we believe, unnoticed, points clearly to the authenticity of the easel pictures.

Raffaelle is but poorly represented. In the *predella* lent by Sir William Miles, despite the stiffness and baldness of some of the figures, there is a certain inimitable grace of flowing line that seems to bear the autograph of the divine artist, if in a youthful or even a restored work. The "Holy Family" (61), unless it has an indubitable pedigree, would be more safely and probably more correctly described as of the school of Raffaelle than under its present great name.

Of Leonardo da Vinci we have a fine "Vierge aux Rochers," in which the face of the attendant angel is especially striking; but in Marco di Oggione's copy of "The Last Supper," we see by far the most faithful record of this wonderful picture that is now extant. The head of Christ is said to have been touched by Leonardo himself. Unfortunately it appears to have been also touched by some far different pencil. While there is an unrivalled tenderness and sorrow about the mouth, there is an expression of dismay in the eyelids, which is unworthy of the rest of the picture. This ignoble shade may perhaps be due to the presence of a horizontal line, or wrinkle, on the brow, which looks like the work of a restorer. But the painting is in good condition. The effect of the sudden shock which has been given to the disciples by their Lord's denunciation of treason, and the varied expression of passion on the several faces, is one of the marvels of art. Our readers may be glad to know that a book may be purchased containing a photograph of the "Supper," and photographs of the thirteen heads, on a larger scale; but no detached details can do justice to the wonderful whole.

Four fine Titians are worthy of the great Venetian. The colossal figure of the Marchese Tarragnio has an imposing presence. The portrait of the Doge, already alluded to, belonging to Mr. Ruskin, presents not only a noble and life-like head, but is an admirable example of due subordination of the less important to the more important elements of a picture. The portrait of a lady (No. 94) recalls the imperial beauty painted by Paris Bordone, and now in our National Gallery.

Murillo is represented by specimens of his best and his worst,—if, indeed, the hard little group called the "Assumption of the Virgin" be anything but a poor reduction of the noble painting in the Louvre. The special mark of Murillo,—the shadowy softness which the kiss of the sun of Spain leaves on the lips of the Spanish girls,—is replaced, in the countenance of this Madonna, by a harsh, hard touch, which is not that of a sketch. The portrait of Andrade, with his tumbled shock of coal-black hair, is a bit of real, evil, life. But the "Good Shepherd" is a gem to which words fail to do justice.

Some great names are so represented in the present exhibition as to suffer injustice at their own hands. Such is the case with Velasquez, and with Giorgione. Las Meniñas is blurred, like a photograph taken out of focus. The portraits of Don Carlos and of Philip IV. are mere bits of court painting,—the latter, especially, clumsily posed on an impossible cart-horse, fades before the grandeur of the idealised portrait of the same sovereign by Rubens. But the portrait of Olivarez, with its appropriately dark and heavy treatment, looks like a daguerreotype of a minister of Satan—which, indeed, was not far from being the function of the servants of the Second Philip.

It would occupy too much space to attempt even a glance at others of the ancient masters. Luini rises almost to the level of Da Vinci. Vandyck asserts his claim to rank as the first of portrait-painters—or, at least, to dispute the palm with Titian. But, *pictoribus atque poetis*, the function of the laureate appears often to be oppressive. Vandyck's portrait of Queen Henrietta Maria is his feeblest work in the exhibition. The glamour of the brown-eyed, brown-haired, full-lipped enchantress (26); the regal beauty of Madame de Sainte-Croix; the truth and dignity of the male and female portraits given under the guise of a Holy Family, with a not very admirable child (the Madonna being a favourite model of this great painter); the Earl and Countess of Northumberland, and the Earl of Macclesfield—are such as to bid the portrait-painters of later times marvel and despair.

Glancing round the rooms, for a third or a fourth lingering look, let us recall the chief gems in each. In No. 1, we have the Vandyck lady (26); Hans Holbein's first Lord de la Warr (23); Moroni's fancy portrait, called Michelangelo (20); the Da Vinci, and the Sir Joshua (6 and 7).

In No. 2, we remark the two Titians (57 and 48), the Tintoretto (50), and the Velasquez (46), the Vandyck (40), the Wilkie (35), "The Holy Family" (30), and the Rembrandt (36), in which the head of Zacharias is the finest piece of ideal portraiture that we ever remember to have seen from the pencil of that great master of light and shade. Eckhoat's "Haman and Mordecai," should be compared with this exquisite Salutation, and the result of the comparison will be almost decisive as to the authenticity of the "Christ Blessing Little Children," in the National Gallery.

In No. 3 hang the "Last Supper," the "Good Shepherd," and the "Blue Boy," works as emulous of one another in the highest order of merit, as they are dissimilar in every other respect. Then come three Gainsboroughs, and a Vandyck (105, 106, 69, and 83); then two Reynolds's (79 and 81).

No. 4 strikes the admiration with the Michelangelo (151); the noble Claude (142); Holbein's "Sir Thomas More;" Gainsborough's "Peasant Children;" Rubens's portrait of himself, and of Philip IV.; and Sebastian del Piombo's "Vittoria Colonna."

Even after feasting the taste on these gems of the great period of art, we can look with pleasure, in room No. 4, on the "Battle of Roveredo," the "Abandoned," "War," and "Münchendam;" and, in No. 6, on the "Snow Storm," and the passage of the Magra.

We trust that the memory of this noble exhibition will be preserved by the preparation of good photographs of every picture before it leaves the Academy. A descriptive catalogue (in which, by the bye, such mistakes should be avoided as speaking of Ixion embracing a cloud in the form of Venus), would be a valuable addition to the contents of the Art Library at Kensington. We congratulate the Academy, the fortunate owners, and liberal lenders of the contents of the exhibition, and the British public, on this most successful opening of the art season of 1870.

Foreign Railways.—The aggregate increase in French railway traffic last year exceeded 1,000,000*l*. The six great companies are now working between them upwards of 650 additional miles as compared with January, 1869. In the first half of December, 1869, the progress made with the great Mont Cenis tunnel amounted altogether to 159½ ft. The distance remaining to be pierced December 15, 1869, was 5,579 ft., so that at the present rate of progress the tunnel will be completed in June or July, 1871.

DRAPERS' HALL, THROGMORTON STREET, LONDON.

A NEW livery-hall and reception-rooms have been built for the Drapers' Company, and are now fast approaching completion. Our engraving represents the interior of the hall.*

Probably few of our readers will recollect much of the old building, as it in no way attracted attention; and it will suffice to say that the front was a plain brick elevation, representing a three-storied structure, with simple stone dressings.

We understand that it was not originally the intention of the Drapers' Company to rebuild their entire premises, nor, indeed, have they now done so. The main reason for the commencement of the alterations was the want of adequate reception-rooms for the company and their guests, the only room available for that purpose in the old building being a long ill-proportioned picture-gallery, barely 15 ft. wide. Another great inconvenience which the company laboured under was the fact that to pass to the reception-rooms from the staircase, which was on the opposite or east side of the quadrangle, they had to cross an open lead flat. It was therefore decided to build a suite of new reception-rooms, and a new staircase on the same side, which indeed formed the first contract entered into.

By the removal of the staircase an opportunity was afforded to increase the size of the dining-hall, which, from the smallness of its dimensions, being only 60 ft. long and 30 ft. wide, had been found quite inadequate for the proper accommodation of the company's livery. It was therefore ultimately decided to rebuild the hall of an increased size, with a new connecting corridor, in place of the old open lead flat; and the whole of these works are, as we have said, now nearly completed.

On glancing at the front, before entering, we cannot fail to be struck with its dwarfish appearance, the frontage having a length of 170 ft., with an average height of only 44 ft., and the details being large. The reason of this, however, is discoverable in the unfortunate narrowness of the street, and the consequent inability to obtain proportionate height without damaging the light and air of the opposite dwellings. It is satisfactory so far that the front wall, as it stands at present, looks like what it is, a screen and entrance to a quadrangle in the rear, the main use of the elevation for lighting being in the upper story of the original design, which it was found impossible to execute. This screen (so to call it) is built entirely of Portland stone, on a granite plinth, 4 ft. 6 in. high, and consists of a series of rusticated arches, of a bold character, occupying the whole height to the under side of the frieze, each bay forming a large window, divided by mullions, the impost of the piers running through as a transom. The keys of the arches are richly carved, the mullions also being relieved with some enrichment. Above the windows is an elaborately-sculptured frieze, some 4 ft. high, of conventional foliage, festooned from alternate rams' and lions' heads (the insignia of the company's arms), over the arch key-stone. Above the frieze is a large enriched cornice, surmounted by a proportionate blocking course and balustrade. In the centre of the front is the principal entrance, consisting of a lofty rusticated archway, with moulded and polished red granite reveal. The cornice over the arch breaks forward and is supported on either side by a console, between which and the key-stone are some carved festoons. Over all is an arched recess, containing the company's coat of arms, in bold relief.

On entering from Throgmorton-street, the use of the front wall as a screen is at once apparent, as we get directly into an open quadrangle from which the lighting of the principal rooms is mainly obtained. The architecture of this quadrangle is more severe than that of the main front. The quadrangle is a square of about 45 ft., surrounded by a cloister 12 ft. wide, leading to the various offices, with a range of five arches on each side, but the heights of the fronts are not equal. The east and west fronts contain the cloister arches on the ground floor, a series of windows over lighting the new hall on one side and the drawing-rooms on the other, with a range of windows over them. The north front has one room only, and the south a corridor over the arches. The internal heights did not allow the arches to be entirely open, and from the springing they are filled in with sculptured

See p. 47.

panels, which form a very prominent and pleasing feature of the design. These panels are modelled and executed by Mr. E. W. Wyon, and represent on the north side, in the centre panel, "Commerce diffusing Wealth," the immediate panel on the left containing Europe, the one on the right America, with Asia and Africa at either end. The east centre panel contains an effective group of Charity with Faith and Hope on either side, and Prayer and Praise at either end. Opposite to these, on the west side in the centre, we find "History taught by Truth," having on the right History and Astronomy, and on the left Mathematics and Geography. On the south side, the centre group represents "Peace and Prosperity," the attributes of her Majesty's reign, with Manufacture and the Fine Arts on the right, and on the left Pastoral Life and Agriculture. The key-stone of each arch is carved into a head having reference to the subject of the panel beneath. The story over the arches is an Ionic order in low relief, the clear-story consisting of a range of semi-headed windows enriched with some carving.

Leaving the quadrangle, and returning to the entrance gateway, immediately on the right are the vestibule and grand staircase. The former at first sight appears rather ill-proportioned, from its height; but it must be considered in conjunction with the staircase, of which it really forms a part. The ceiling is effectively treated with elliptical groining, in which are introduced four circular stained-glass lights, being the only means of lighting this part of the building. The floor will be paved with Maw's encaustic tiling, arranged to a suitable design, with the arms and monogram of the company in the centre.

From the vestibule a short flight of five marble steps leads into the grand staircase. This is circular on plan, being 29 ft. in diameter to the centre of the columns by which it is surrounded, dividing it into eight bays, the whole surmounted by a dome, the height of which from the ground to the apex is nearly 70 ft. The staircase is a striking feature, the greater portion being executed in marble. The steps, which, from their circular form, are all winders, are in Vere vein, 9 ft. 6 in. long, solid, and moulded. The styles and rails of the wall-lining are of similar marble, the panels being of jasper, bordered with green marble. The moulded string or plinth under the wall-lining is of Griotte; the outer string or plinth of balustrade round the open well of staircase is of Bardilla. The balustrade itself is at present not executed, but it is proposed to form it with balusters of Devonshire spar, of unique character, finished with a handsome handrail to correspond with the string. The pedestals of the columns are inlaid with Rosso Antico of a very rich character, the columns themselves being monoliths of ¾-diameter Devonshire Ipplepen marble, 14 ft. high in shaft, and 1 ft. 8 in. in diameter, with veined marble base and alabaster capital. The piers and arches between the columns are of Huddlestone stone, and where forming the openings from vestibule and landing are panelled and inlaid with Emperor's red and Irish green marbles. The arched recesses facing the vestibule and new reception-rooms will be filled in with mirrors to reflect the perspectives, the remaining two containing niches, which afford an opportunity for good sculpture. The paving on the landing and in the circular corridor is laid with a ground of vein marbles, inlaid with margins and centres of various colours. Over the columns runs a plaster entablature, the frieze broken up with moulded consoles at intervals of about 3 ft. festooned between.

The dome is principally constructed of iron, executed by Messrs. Philips, of the Coal Exchange, in a rather novel manner. It is formed of ribs in one length of two rolled H irons bent to the curve and riveted together on the flange. These ribs rest at the bottom on a continuous iron curb, cast in sections with shoes to fit ends of the ribs, and bolted together. The ribs are secured at top with a wrought-iron ring, from which springs an upper dome formed in the same manner. Between the iron ribs is a framework of timber. Externally the dome is covered in the usual manner, with lead on two thicknesses of diagonal boarding. Internally the groundwork is formed of canvas plaster, enriched with *carton pierre* ornaments, of which may be more particularly noticed those on the face of the ribs, of laurel leaves and berries, very freely and well modelled.

The whole light for the staircase is obtained from the dome by circular-headed iron sashes filled with coloured glass round base of dome, and in the upper dome the whole space between the ribs is occupied by large sheets of plate-glass bent both ways to the required curve, with coloured design. An ornamental pendant occupies the centre of the upper dome at the convergence of ribs, through which the staircase is ventilated. The mode of lighting the staircase at night is by a partially-concealed ring of gas jets on the top member of the cornice behind a metal cresting. The decoration of the dome is effectively treated in rich yet sober colouring; the bronzing of various parts contrasted with the lighter colouring in the panels, giving the appearance of strength combined with lightness in the construction.

Passing through the arches on the landing, we notice a circular corridor separating the staircase from the reception-rooms. Where the arches intersect the wagon-headed ceiling are small circular domes, the upper part filled with tinted glass, lighting the corridor.

Hence we enter the new reception-rooms of two drawing-rooms, and a room generally used as the court dining-room, the whole forming a suite of nearly 130 ft. in length, extending from the staircase to the company's private garden in the rear.

The first room is 45 ft. long by 29 ft. wide and 20 ft. high; the second, 26 ft. long by the same width and height; and these are quite new, the room in the rear being only partially so. The new drawing-rooms are divided into bays by composite pilasters, supporting a frieze band, enriched in relief, from which spring handsome coupled consoles connected with the bands of the ceiling, which by them is divided into recessed coffers, the enrichment of which is pierced for ventilation. The whole ceiling is highly enriched and decorated in a very effective way with blue, white, and gold; but a great deal of the effect of these new rooms will necessarily depend on the taste displayed in the furniture and hangings, for which the rooms are now ready. The doors deserve notice, consisting of a carved cornice and frieze in wainscot, supported by consoles having swags of natural foliage very well carved, we believe, by Mr. Barfield, of Leicester. The doors are formed of mahogany, with wainscot moulding, the upper panels being filled with glass, the lower inlaid with various coloured woods.

The Court Dining-room forms part of the old premises, thoroughly renovated. A handsome oak wainscoting, some 8 ft. high, has been carried all round the room, with new frontispiece to the fireplace and sideboard, a mirror opposite, and doors of the same material. The room boasts of a very good old ceiling of the Queen Anne period, which has not been removed, but has been redecorated, and the centre panel filled with an effective painting of the legend of the Golden Fleece. The cove of this ceiling, formerly plain, has been enriched with a series of shields bearing the arms of the past masters of the company. From the smaller drawing-room we gain the court-room, which also is not new, but has been refronted, and has a new ceiling. The ceiling is panelled in plain bands, and is decorated in colour, and two medallions, taken from the old ceiling, may be noticed as very superior work.

From this room we enter the Great Dining-hall, which at a glance we see to be a large room, square at one end and semi-circular at the other, over which is a half-dome, meeting the ceiling of the other portion, and round the room stand disengaged columns, forming a composite order, in marble. Our view represents the hall as seen looking towards the circular end. The floor-space of the hall averages about 80 ft. by 40 ft., the actual dimensions being 82 ft. from north to south, and 46 ft. across into the recesses, with an average height of 44 ft. The order stands upon pedestals, with plinth of black and gold marble, the capping and base mouldings of Bardilla and die of green marbles, which, with the panelled recesses, form a continuous dado of marble round the hall. The columns themselves are all monoliths of the same dimensions and marble as those of the staircase, with quarter-diameter pilasters behind each, likewise in one stone. The bases are of vein marble, and the caps and cornice are of plaster. Altogether there are twenty-eight columns and pilasters, out of which twelve are coupled round the semicircular end, and eight at the north end. Above the cornice is an upper range of semi-headed windows, or clearstory, measuring 10 ft. from the top of the cornice to the cap moulding of the piers, from which springs the cove supporting the ceiling. On this cove and over the columns are a series of consoles, springing in low relief and developing into the upper portion of colossal male figures, which, with uplifted arms, support the main band of the ceiling. The ceiling itself is panelled with a very pleasing minority of harsh lines. The centre consists of a large circular band enclosing a wreathed quatrefoil, in which, again, is a mixed circular radiating centre, of a flat ogee section, surrounding a large sun-burner which forms an essential point in the ventilation of the hall. The half-dome at the south end, the execution of which was caused by the inability of carrying the front wall sufficiently high, is, as is also the ceiling, executed in "fibrous plaster," with *carton pierre* enrichments, the panels between the ribs containing tinted glass for the lighting of the dome. At the base of the dome, over the cornice, which is supported by the coupled columns before mentioned, is the ladies' gallery, which is bronzed and gilded, and forms a prominent and not unpleasing feature of the whole.

The spaces between the columns are occupied on the west side by five windows; opposite to which, on the east side, are panels of a corresponding size, to be filled in with some of the company's pictures of the English kings. The spaces between the coupled columns under the gallery, and at the north end, are panelled, enriched, and treated in colour. There are also at the north end two circular niches, which, again, afford a good opportunity for sculpture; and we may also notice four circular medallion panels, which are to be filled in with female heads, representing the four seasons, modelled and executed by Mr. Wyon.

It is at this north end that the master will sit at the company's entertainments; and behind him will be placed a large mirror in an arched recess, holding and reflecting the very fine plate belonging to the company. Over the master's chair, above the cornice, stands, in bold relief, the arms of the company with the Royal and City shields on either side.

The three clearstory windows at the end are already filled with very effective stained glass, executed by Messrs. Lavers, Barraud, & Westlake, representing in the centre window, which is circular, the company's arms, combined with those of the nation and City; and on either side the figures of Fitzalwyn, the first Lord Mayor, who was a member of the Drapers' Company, and Henry VI., who granted the charter. We are glad to understand that it is proposed at once to fill the remaining clearstory windows, six on each side, with stained glass of a suitable character.

A word may be said in reference to the effective circular lobbies by which the hall is approached on either side, which have a marble dado, and are finished above with decorative plaster.

The flooring of the hall consists of wainscot boards, in narrow widths, on a counter floor of deal, the margin and recesses being formed in Arrowsmith's very excellent parquet work.

Gaseliers hang from brackets between the columns round the hall, and deserve notice. These were supplied by Messrs. Bassingham & Sons, of Whitecross-street, by whom the whole of the gas engineering throughout the premises has been ably carried out.

The connecting corridor between the hall and principal staircase, is 45 ft. long, 10 ft. wide, and 19 ft. high, with a wagon-headed ceiling. It is divided into five bays by coupled composite pilasters, from which spring bands dividing the ceiling into panels, in which a diaper pierced for ventilation has been introduced, the whole being quietly treated in colour.

The pilasters stand upon a dado, having a Devonshire marble plinth, and the flooring is of a simple pattern in parqueterie.

The only remaining portion of the premises to be noticed, is the kitchen, and domestic offices attached. The former is, we believe, now one of the largest in London, being 66 ft. long, 38 ft. wide, by 20 ft. high, and is fitted with all the latest improvements for steam service, lifts, and so on. The remaining offices, consisting of house-steward's living and business rooms, pantries, sculleries, seem to be conveniently arranged in connexion with the kitchen and hall.

The warming of the principal rooms is effected by hot-water services supplied from two boilers by means of fresh air passing over the pipes, and has been carried out by Messrs. D. & E. Bailey, of Holborn.

The contractors for the general work are Messrs. J. Barnsley & Sons, of Birmingham, the stonework forming a sub-contract, let to Messrs.

Beevers, of the Borough-road. The marble-work throughout is by Messrs. Field & Co., of Westminster; the *carton pierre* by Messrs. Jackson & Sons, of Rathbone-place. The general carving, with the exception of the frieze in Throgmorton-street, which was executed by Mr. Mabey, has been done by Mr. Seale, of Walworth.

The decoration has been intrusted to Mr. Crace, who has most carefully and tastefully performed his portion of the work, and the whole building has been carried out under the direction and superintendence of Mr. Herbert Williams, of Old Broad-street, architect. Mr. Williams was the first pupil of the late Mr. Samuel Angel, from whose designs Cloth-workers' Hall was built, and has been the company's Surveyor for the last fifteen years. He has produced a set of very handsome apartments. It need scarcely be said a very large sum of money has been expended.

ON THE ENFRANCHISEMENT OF COPYHOLDS OF INHERITANCE.*

ALTHOUGH so many enfranchisements have been effected in recent years towards the abolition of a tenure which has long survived the necessities it was designed to meet, copyholds still exist in such vast numbers as to cause their enfranchisement to be a subject which intimately concerns most of those who are connected with this institution. . . . .

The Copyhold Act passed in 1852, enacted that in the case of any tenement to which the next admittance should take place, on or after the 1st of July, 1853, the tenant should have power to compel an enfranchisement, in consideration of a gross sum; or the lord (subject to proving his title, if desired, to the satisfaction of the commissioners), might compel the tenant to take an enfranchisement in consideration of the payment of an annual rent-charge. Either of these considerations, or lands, &c., might (as before) be, by mutual agreement, the compensation for the enfranchisement; and enfranchisement rent-charges, as well as commutation fines and rent-charges, need not be variable with the price of corn, but might (as advised in the commissioners' report of 1850) be of fixed amounts. To prevent hardships or injustice in special cases, the commissioners were empowered in one section to suspend proceedings for enfranchisement, and in another to govern cases in which an enfranchisement would prejudicially affect the mansion-house and grounds of the lord. Common rights were to continue to attach to lands enfranchised under the Act; and rights to mines, minerals, sporting, and royalties of other kinds, were to remain undisturbed, except by consent.

The latest Copyhold Act (1858) superseded by fresh enactments a short Act that had been passed in 1853, mainly with reference to cases in which the lords for the time being had only a limited interest. It further repealed all the provisions of the former Acts, by which a tenant might be bound to pay for either commutation or enfranchisement a consideration to which he had not specifically agreed,—provisions upon which the original copyhold commissioners had relied, notwithstanding the many and cumbersome clauses that it had been found necessary to enact for the purpose. It also extended the right of compulsory enfranchisement to cases in which the latest admission had taken place prior to 1st July, 1853, providing, however, that if such enfranchisement were promoted by the tenant, he should tender the value of a fine and heriot, and two-thirds of the steward's fees,—a proviso now of no pecuniary importance.

The schedules appended to the commissioners' reports of late years enumerate transactions of an extent which is indicative of the thorough working order of the commission; and the terms of the reports themselves are varied only by occasional statements of the exercise of the commissioners' discretionary powers in suspending enfranchisements which would have worked a hardship to individuals, the grounds alleged in several cases being an excessive estimate of the value of the interest of the lord.

Upon this important subject the commissioners have published two documents, indicating the terms for enfranchisements. The first of these, issued in the early days of the commission, stated, *inter alia*, that the enfranchisement from fines arbitrary was usually made at from four to six years' value of the tenement (*i.e.*, about two and a half fines), heriots being paid for similarly at the rate of two and a half heriots on the average of the last three, the quit-rents being valued at twenty-five years' purchase. The commissioners offered this statement as only a rough guide for what were at that time comparatively rare transactions; and, regarded as such, nothing need be said to its detriment. On the other hand, the second document, issued in 1855, and having reference to enfranchisement from ordinary arbitrary fines, presents an appearance of the most refined exactness; three years' purchase of the annual value is set down as the consideration for enfranchisement by a tenant of the age of twenty, five years' purchase for one of seventy, and for each intermediate age a year's purchase is given, to six decimal figures.

Against this table, Mr. Rouse, in his "Copyhold Enfranchisement Manual," brings a number of objections, the most noteworthy of which are that the table does not extend to ages older than seventy, and that it makes no distinction between fines arising from houses and those arising from land. If it is, indeed, the case that the copyhold commissioners, when publishing this table, intended that no deviations from it should be permitted in respect of either the nature of the property or the extreme age of the tenant, then the table is certainly open to such objections. But if the commissioners merely wished to give for ordinary cases a sort of mean standard for guidance in respect of age, then on adopting Mr. Rouse's statement of the fines occurring upon an average every fourteenth year, I propose to show in parallel columns that the values of such fines are about as nearly indicated by the commissioners' table as by those which Mr. Rouse has prepared in its place. Few valuers, however, can have failed to be struck with the oddness of its giving to within the two-millionth part of a year's purchase the actuary's graduation of materials which are necessarily very coarse on account of the singular circumstances that in these holdings the fine paid upon the creation of any tenancy is irrespective of the age of the tenant admitted, and also irrespective of the rate per cent. which the particular property is supposed to yield as an investment, and further that a very similar fine may be repeated at any moment after an alienation.

However, although we all know that such apparent exactness in this matter is merely an extravagant fiction, there is no occasion to go to the other extreme, and to ignore almost entirely the business of an actuary, and trust to the lucky chance of a balance of errors. The proportion of a fifth of the fee-simple value, or a sixth of it, or something between the two, is commonly agreed upon as the consideration for an enfranchisement; but the adoption of this in preference to some other fraction, such as a third or an eighth, is based upon a calculation by some actuary in time past, and a thoughtful valuer must desire to have in his possession a table which shall enable him to make a reasonable allowance for every year's variation in the ages of the copyholders.

Mr. Scratchley, an actuary, and formerly a Fellow of Queen's College, Cambridge, has written a manual on the enfranchisement of copyhold property, but the main purpose of the book seems to have been the promotion of Copyhold Enfranchisement Societies, which should have the good effect of helping tenants to enfranchise and improve their property, by making them advances of money secured through life assurance. As regard the terms for enfranchisement, I do not observe that he does more than give the established formula for finding the value of a series in perpetuity of fines of 1*l.*, payable by successive lives assumed to be all of the same age at the time of succession. The formula may be expressed in words as that of dividing one fine by the difference between unity and the present value of 1*l.* payable on the extinction of a life now of the assumed age. The quotient is the value of the fines of 1*l.* in perpetuity, the first being payable immediately; and this value has, therefore, to be discounted for the term of such life as may be in possession. But he points out that the formula will require modification at the hands of the valuer, on account of the fines from copyholds being also payable at other times than upon inheritance.

Mr. Rouse, in his manual before referred to, has entered upon the subject very fully; and, in addition to the arithmetical portion to which alone this review will refer, his work contains a large amount of, I believe, most serviceable legal information, particularly his digest of the Copyhold Acts contained in the third and latest edition.

At pp. 97-9, he writes of the value of enfranchisement from fines when payable only on admissions after the deaths of successive tenants; and to such a case, therefore, the above-mentioned formula may be applied. Accordingly, the correct result (or nearly such) is given by Mr. Rouse for the enfranchisement to a tenant about to be admitted, and aged 44—which is here suggested by him as the average admission age—viz. (assuming 3 per cent. compound interest), 4·2 years' purchase, of which 2, he says, are for the fine now payable, the remaining 2·2 being for the enfranchisement from future fines. He very properly goes on to intimate that if a life of an age younger than the average—one of 30, for instance,—is about to be admitted and to enfranchise, the discount of the second and following fines will be larger; these being more remote, their value will be proportionably less than the 2·2 they were worth in the case of a life of the average admission age, 44,—which is evidently the same in effect as deducting more than the fine of two years' purchase from 4·2, or the value of the fines in perpetuity. And he adds, "Should the value be required when there is a life on the rolls, the value of that life will be estimated in like manner."

It is surprising that after this perception of the principles of the case, Mr. Rouse, in passing from his explanatory remarks to his "Rules," should give for the same case a rule (No. 7, p. 115) which produces a widely different result. He here abandons the assumption of forty-four being the average age of copyholders when admitted; and for the value at 3 per cent. of the series of fines from the present time for ever he names 4·8 years' purchase instead of 4·2, basing the former upon an assumption which he here introduces, that in the case of lands the intervals between the admissions will ordinarily be found to average eighteen years, whilst in the case of house property he suggests sixteen years. These intervals are, however, materially shorter than the expectation of life at the age of forty-four; and it is not shown why fines payable only after the deaths of the tenants should happen more frequently in the case of tenants holding houses than in that of tenants holding lands. However, the discrepancy in the values assigned by him in the two places to the perpetuity of the fines at 3 per cent. is of comparatively little moment; the more remarkable circumstance is the divergence between his remarks and his rule as to the allowance to be made from the perpetuity in respect of the age of the tenant on the rolls. The plan laid down in his rule is to deduct from the value of the series of fines only a single fine of two years' purchase in the case of the best possible life, and to deduct in the case of any other age a proportionate part of such two years' purchase; that is to say, he makes here no greater abatement in respect of the best possible life, a child, than that which he had properly shown in his previous remarks to be needed in the case of a life of forty-four; and makes, indeed, a smaller abatement than that which was rightly called for in the case of a life of thirty. *Both* of his plans cannot be right; it is the second which is erroneous. The circumstance that it is possible for a very young life to be admitted on payment of the fine is not apposite to the question, for the best possible life is an extremely exceptional and not the average holding assumed in order to capitalise the fines. For the latter we might take a life of the average age of copyholders at the time that they inherit; and it is therefore on an enfranchisement to a tenant of this average age (as in his previous remarks) that the deduction of the two years' purchase should be made, a specific deduction of a greater or less amount respectively being needed in the case of a younger or older aged tenant.* I have dwelt thus much

* From a paper by Mr. Edward Smyth; read at the Ordinary General Meeting of the Institution of Surveyors, January 10th, 1870.

* Adopting the notation of Mr. Peter Gray's classical paper on the "Theory of Successive Lives," in the second volume of the *Journal of the Institute of Actuaries*, the value of the perpetuity of the periodical fines of 2*l.*, the first being receivable at the end of the year (of age) in which the present tenant, aged x, may die is

$$\frac{2}{1-A_y} A_x = \frac{2}{1-A_y}\left(1-\frac{1+a_x}{1+P}\right) = \frac{2}{1-A_y} - 2\frac{1+a_x}{1+a_y}$$

When the present tenant happens to be of the average age of tenants at their admission (which we may put for the uniform succession age y in the formula), $x=y$, and we have simply to deduct 2 from the $\frac{2}{1-A_y}$, which is the value of the fines in perpetuity when the first is to be paid immediately.

upon this discrepancy because, in the ordinary case of fines on admissions after death or alienation, to be next considered, Mr. Rouse has similarly framed his rule and tables with a regard to the best possible life, and its inapplicability is rather more readily seen in the case of fines only payable after the deaths of the successive tenants; but I am not acquainted with any manor in which this is the custom.

With reference to the ordinary case of copyholds subject to fine arbitrary admission after death or alienation, Mr. Rouse points out (p. 85) that the way to calculate the value of the fines "is to find on each manor the average interval which has elapsed between changes of tenants, for such a period of time as will give a fair average; and to then calculate on such average, allowing for the difference in values depending on the ages of the tenants standing admitted. The adopting one fixed average interval," he continues, "would be unjust in many instances towards the lord, and in many towards the tenant; though, for practical purposes, the result of considerable investigation into the matter shows that in most manors the average interval of fifteen years as to land and thirteen years as to house property, will be a just average to be calculated on as between lord and copyholder." He then capitalises the fines from lands at 3 per cent. compound interest, and those from houses at 4 per cent.,—a distinction which seems reasonable.

It may be worth pointing out, however, that some injustice is done to the lord by valuing the manor fines upon the assumption of their occurring at regular intervals, instead of at the fluctuating intervals at which they are really received; for it denies to him some of the compound interest which he can make upon his earlier receipts. But I welcome this circumstance as a very desirable set-off for the injustice which is done on the other hand to the tenants by capitalising the fines as of two years' purchase each, whereas it is now very general to take a rather smaller fine in cases of alienation,—although this, by the way, is exactly the reverse of a common practice two centuries ago, as recorded by some writers.

On the question of the allowance to be made for an existing tenancy, I differ from Mr. Rouse, as before intimated. He says (p. 87), "The difference between the value of an enfranchisement where no life is on the rolls, and that where a life of the greatest value stands admitted, and in which the full manorial interval is calculated as that at the end of which the first fine will be payable, will be one fine, or in the case of fines arbitrary, two years' value. It will therefore follow that, if the best life be equal to a reduction of the two years' value, as the value of the life diminishes, the portion of the two years' value to be deducted will diminish." This assumption of the best life being equal to a deduction of two years' value, or one fine, is, I submit, inadmissible. We have seen it to be irrelevant and productive of considerable error in the assumed case of fines payable only after death; and it is impossible to conclude that the incidental introduction of occasional alienation fines can give to the best possible life any theoretical connexion with the present question. And observe the effect. At page 128 the perpetuity of the fines of 2*l.* every fifteen years is stated to be worth, in the case of a vacant tenancy (speaking roughly), 5½ years' purchase at 3 per cent. interest, and we are there directed to charge 3½ for enfranchisement if the tenant on the rolls is the best possible life, a female child under 6. But that value of the perpetuity is arrived at (Table VIII.) by taking the fine of two years' purchase payable now, and taking 3½ as being the total present value of the fines payable in 15, 30, 45, &c., years. So that in charging this same 3½ years' purchase for the enfranchisement in the most exceptional case of this young child, we shall be calculating as if, notwithstanding her extreme youth, the next fine would yet occur at the end of the *average* interval of 15 years—an assumption which I think indefensible. It does not do justice to the young tenant; she may not alienate at all, but may hold on till death, and, therefore, her most unusually good life indicates a probability of the lord's next fine being distanced beyond the average interval. I submit, as before, that the deduction of one fine is appropriate only to a tenancy which is likely to last for the average period, and this average holding is not to be found in an extreme case—in the scarcely possible tenancy of a child under six. For want of a record of the relative frequency of the occurrence of surrenders at successive ages, I propose a tenancy at the average admission age,—say 35,—as a practical standard, and make for younger or older ages respectively a reduction larger or smaller than a single fine in proportion simply to the values of life annuities at such ages as compared with that of a life annuity at the age of 35.

THE LATE MR. JAMES WYLSON, ARCHITECT.

THE decease of Mr. James Wylson, architect, which took place on the 6th inst., at his residence, in Islington, will occasion, among a large circle of personal friends and others, a feeling of deep regret at the loss of one who was alike distinguished for the variety of his acquirements and general knowledge, and for his estimable social qualities in private life. In the former capacity, the bent of his inclination was decidedly in favour of the *practical* and the *useful* in science and art; his delight being to study out mathematical problems, or abstruse calculations, which his naturally ingenious turn of thought led him to devote to good account; while, in the latter capacity, those who knew him best could best appreciate that frank geniality of disposition, and that ready flow of lively and instructive conversation which constituted the great charm of his society. When, on such occasions, some new idea happened to be started, or some question appeared to be capable of further elucidation, he was invariably loth to let the matter drop until it had been sifted to the utmost; and he would frequently take down one volume after another, from the well-stocked shelves at hand, to assist in the investigation: nor was it an uncommon thing to discover that many of these volumes had been already enriched by careful references or marginal notes in the handwriting of the owner. From this remark, it may be judged that Mr. Wylson was emphatically a man of persevering research, as well as of method; and such were, in truth, prominent traits in his character. His industry was most remarkable, nor less so his constant habit of "system" in all that he did. He had "a place for everything, and everything in its place." Indeed, but for this, it would have been impossible for him to have accomplished what he really managed to do in an incredibly short space of time; and this without in the least degree passing over things superficially.

Mr. Wylson was at all times, and on a variety of subjects, a ready and accurate writer. Besides his frequent contributions to the current literature of the day, which were always something beyond being merely acceptable, his versatility was displayed in his aptitude for composing poetry (especially of the humorous kind), and for music. In these fancies he would occasionally indulge when corresponding with his friends; and they are privileged to possess, in either the single or combined form, many of these clever effusions, some evidently thrown off on the spur of the moment. This varied use of the pen would appear to have been continually resorted to by him as a source of actual recreation, until the increased pressure of special duties imposed a comparative restriction; for, in addition to what appeared from time to time in print, the amount of manuscript he has left behind him would fill volumes, irrespective of certain important works which he was preparing for distinct publication. He was one of the earliest contributors to the *Builder*; and an article by him which appeared in this journal for the year 1844, upon "Cements," attracted, among others from the same pen, considerable notice. He afterwards edited the "Engineer's Pocket-book"—a highly useful publication; and in 1859 appeared his "Mechanical Inventor's Guide,"—a work containing a mass of condensed information, designed to form a practical introduction to the principles and components of machinery; being further illustrated by copious diagrams drawn by himself, and also a collection of nearly 300 mechanical movements.

A few additional particulars respecting Mr. Wylson's general career will not be uninteresting. He was born at Glasgow in 1811, and served an articleship of five years to an architect in that city, of the name of Weir, with whom he remained for four years longer. In 1836 he removed to Norwich, and for a brief time assisted Mr. John Brown, a well-known architect residing there. Upon arriving in London shortly afterwards, he was engaged by Mr. Sydney Smirke as a senior clerk in his office, where he remained till the year 1843. About this period the writer of the present notice became acquainted with Mr. Wylson, being, in 1842, one of a few "architectural draughtsmen" who formed themselves into an "association," with that gentleman at their head, Mr. Wylson being both the originator of the movement and its first secretary. When circumstances necessitated his relinquishment of the latter office, he was presented with a handsome pair of silver compasses, expressly designed for the purpose; and, by way of record, it may here be mentioned, that the association first held its meetings in Castle-street, Holborn; next in Southampton-street, Strand; then at Lyon's-inn Hall (also in the Strand, and since pulled down); and now, in a more developed form, it is known as the "Architectural Association," meeting in Conduit-street, Regent-street.

Mr. Wylson first established himself in practice in his native city, where he designed and carried out many important public and private works, among which may be mentioned, an extensive range of "model dwellings for the labouring classes," the Prince's Theatre (since cleared away, the site being otherwise required), and St. Luke's Free Church. To the pulpit in the latter edifice he successfully applied, in 1855, the theory of the parabolic form as a sound-reflector. He also assisted in establishing the Glasgow Athenæum; and, for his professional services rendered to that institution, the Board presented him with a life-member's ticket, and also elected him a director. In 1848 he received, out of 100 designs, the first premium for a plan for laying out the lands of Gilmore Hill for building purposes. Previously to his quitting Glasgow, in 1850, to return to London, he was honoured with a public dinner, by invitation from his brother architects; and his first engagement in the metropolis appears to have been a responsible post in the office of the late Sir. C. Barry. His course for the future became somewhat changed, when he was chosen, out of fifty-five candidates, surveyor to the National Freehold Land Society, which appointment he retained until the trade in land being seriously affected by the Crimean War, his "department" was annulled. He was subsequently elected (about ten years ago) surveyor to the Conservative Land Society, which office he continued to hold until his death, as also a similar office in connexion with the United Land Company, Limited, which has been only comparatively recently established.

In the discharge of his multifarious duties, as in everything that he undertook, Mr. Wylson, was truly indefatigable,—a man of the strictest integrity, and so utterly unselfish, that there is reason to believe that his removal was hastened by this very conscientiousness; inasmuch as, although subject of late years to severe attacks of a distressing complaint, it was with great difficulty that he could be persuaded, under any circumstances, even partially to relax his efforts; and he may be said to have died literally in harness. His remains were interred on the 14th inst. in the Brompton Cemetery.

J. D. W.

THE SUEZ CANAL, AND THE GEOGRAPHICAL SOCIETY.

A CROWDED meeting of the Royal Geographical Society has been held in the theatre of the Royal Institution, Albemarle-street, to hear from Lord Houghton, "the Society's envoy," an account of his visit to the opening of the Suez Canal. The chair was occupied by Sir R. S. Murchison, the president.

To the undertaking itself, Lord Houghton said, he was not disposed to attribute any vast importance, either geographically, commercially, or politically; and he accounted for the canal not having been made generations ago by the simple circumstance that it was not [then?] wanted, and that the connexion of the two seas was not in harmony with the commercial ideas entertained in past times. Having traced the origin of the newly-constructed canal to Père Enfantin, and frankly acknowledged the firmness, ingenuity, and address which M. Lesseps had displayed in carrying out the project, his lordship defended the attitude which Lord Palmerston had adopted towards the undertaking, by explaining, that what *he* opposed was, not the making of the canal as now constructed, but an arrangement which would have handed over to a French company, and through it to the French Government, nearly a whole province of Egypt, and the employment of what was called "free," but would really have been "forced," labour for

the construction of the works. With reference to the opening of the canal, Lord Houghton said, he made the passage in the *Hawk*, and the soundings which were taken all the way were never less than 18 ft. He exhibited a specimen of the rock which "cropped up" so unexpectedly at Serapeum; and expressed a confident opinion that that and one or two other obstacles had been so far removed that we might now regard the canal as in the nature of a railway, upon which had been laid down a single line of rails, that might be doubled at a cost of about a couple of millions as soon as it was necessary. The immediate effect of the canal, he anticipated, would be to encourage a direct trade between Trieste, Italy, Greece, and the Levant, and India; but he did not believe that it would at once materially affect the commerce of England and France.

THE POET LAUREATE'S NEW HOUSE.

MR. ALFRED TENNYSON'S new house near Haslemere is a stone structure of considerable dimensions, approached by a broad carriage-drive to the principal entrance, which is a large porch of five pointed arches, so arranged, however, that visitors cannot alight under it, as it is paved and approached by three steps. The style of architecture does not carry us back to the days of Arthur, nor have we in the new house any strong reminders even of the age of knights of chivalry; its architecture being a free treatment of domestic Gothic of the Tudor period. In the principal rooms the windows are two lights in height (divided by a transom), and divided again into five by mullions; it is virtually two stories high, with heavy slated mansard roofs, with large flats and lead flashing. The upper part of the house is most attractive, having a series of rich dormers, three in front, two at back, and one over the porch. These dormers have two double lights in front, and one on either side to light the third or attic story, each dormer having a stone gable supported by two buttress-pinnacles, the gable itself being enriched with a shield (earlier in character, however, than the rest of the house). The chimney-stalks are very large, square, with bevelled edges, and well carved with diaper work; round the entire cornice is an open panelled parapet, and the ground and first floors are divided throughout by a richly-carved band in panels, only breaking into a series of open quatrefoils over the entrance porch.

THE DISMISSAL OF BARON HAUSSMANN.

THE great architectural autocrat, as our readers must by this time have observed, has been swept away with the Imperial *régime*, which has been peacefully superseded by Parliamentary rule at the instance of the Emperor himself, who evidently thinks his people are at length prepared for the British mode of government. The Baron gives up his position regretfully and unwillingly. He says he had hoped to finish his work first. But what may finishing mean? He has aided the Emperor astutely in converting Paris into something like a city of palaces; but then the middle class and the poor must live; and the cost of living in Paris to such classes is already doubled, or more than doubled; both rents and articles of consumption having been enormously increased by Baron Haussmann's proceedings. It is well to have a magnificent city; and Paris is an example to us in many respects; but see how inconsistent with a free or Parliamentary government such rapid and sweeping architectural and other improvements are! No sooner is Parliamentary government introduced, than down falls the Haussmann who forced them on certainly too fast. The Parisians probably even yet have not experienced to the full extent the evils resultant from their splendid improvements and their gigantic civic debt.

M. Chevreau, late Prefect of the Seine, has replaced Baron Haussmann, which is regarded as a sort of compromise.

Baron Haussmann, above all men, who, as a power, could not have existed in London, thus compliments our Parliamentary system, in a farewell address to some of the Parisians:—

"What consoles me," he remarked, "after so many efforts, is, that I fall enjoying the entire confidence of my Sovereign, and possessing your esteem and affection. Ah! gentlemen, it requires courage and devotedness to hold public functions in France, and to consecrate to them efforts and facilities which in the liberal professions would have procured independence and fortune, but which, employed in the service of the State, often lead only to bitterness and disappointment. In a neighbouring country—the cradle of the parliamentary *régime*—the case is otherwise. In the presence of a great national work, party spirit is silent, and political passions give way before feelings of patriotism; and when a man has had the good fortune if not the merit to attach his name to it, a universal protest would be raised to protect him from unfair depreciation and calumny."

PROPOSED UNION OF FRANCE AND ENGLAND.

SIR,—If I am late in thanking you for kindly reporting the production of my scheme to the annual dinner of the Society of Civil Engineers, I can avail myself of the possibility of stating at the same time the wonderful echo which your article has made through the world.

Not only half a dozen of English papers that I know of, besides many that I may have no knowledge of, have mentioned the matter from your journal, but upwards of twenty-six French papers, Parisian and provincial, have done the same, and all "from the *Builder*," which I feel very glad to acknowledge.

The *Corps Impérial des Ponts et Chaussées* have had a communication of the scheme from myself, and not one objection has been raised against the "perfect," said they, "practicability of the same." The only one objection is consequently the political question, as hinted to by yourself. I know it will be the chief impediment; but I hope some day or other it might be put aside.

Paris. EUGÈNE BUREL.

PROJECTED HOLBORN DISTRICT IMPROVEMENTS.

A REPORT by Mr. Lewis H. Isaacs, the Surveyor to the Holborn District Board of Works, on certain bills, for a new market, and for tramways in the district, has been printed. The Charter-house market is proposed to be erected on the area lying between Cow Cross-street and Charles-street, on the north and east, Charter-house-street on the south, and Farringdon-street on the west. Property behind Cow Cross-street, and Charter-house-street, would be purchased, and frontages obtained along the south side of Charles-street and the east of Farringdon-road. Covered ways would run to the new meat-market and to the Farringdon-street railway station.

The surveyor does not suggest any decided opposition by the District Board to the project, but anticipates strong opposition on the part of the City authorities. The tramway bills are considered in some respects objectionable, as they virtually give a private company a monopoly of portions of the public thoroughfares; and the reporter suggests that it would be far preferable, if possible, for the various authorities to unite in extending granite tramways along the great lines of route.

THE LATE MR. WILLIAM BLAND.

MANY of our readers know Bland's "Arches and Piers." The author of it, a respected country gentleman, living at Hartlip, Kent, died recently, at the age of eighty-one, where few knew him as the author of scientific works that had silently grown into reputation. He was born in Sittingbourne, and educated, first at Caius College, Cambridge, and then at Edinburgh. Whilst at Edinburgh, and during the long evenings, after writing out the lectures of the day, he drew plans for a house his father contemplated building; and one of these, with some slight alterations by a professed architect, being chosen, the house, then called New Hartlip Place, was commenced in the spring of 1813. The mode of warming, Mr. Bland's invention, is admirable. The tank of the house he himself dug during winter, and in the course of time commenced digging the well, out of which he was the last to come when it was finished. It is 138 ft. deep, 100 ft. of which is through chalk. He also made the occasion useful for experiments on the temperature at various depths. In 1827 appeared "The Principles of Agriculture," which reached a second edition in 1863. He next published his "Experimental Essays on the Principle of Construction of Arches, Piers, Buttresses, &c.," a new edition of which appeared in 1862. This was the result of a long series of experiments by means of wooden bricks, and visits to nearly, if not all, the cathedrals and many churches of the kingdom. Simultaneously he was hard at work on the estate in raising and planting trees, and in the improvement of all sorts of machinery in use on the farm, especially the drill plough invented by his father, and a lock for granaries and stables, the principle of which Chubb (from information given by Mr. Bland) has applied to chests.

About the same time he published the first edition of a work called "The Forms of Ships and Boats."

The donation of Roman antiquities made by Mr. Bland to the Chillington House Museum, leads us to refer to the excavation, some years since, of an extensive and interesting Roman villa in a field at Hartlip, about a quarter of a mile from his residence. This he very liberally excavated at his own cost, throwing it open to the free inspection of the public; and many must remember the uniform kind reception given by the generous proprietor to archæologists and other scientific visitors, and the hospitality of Hartlip Place. A very elaborately illustrated account of this villa appeared in Mr. Roach Smith's "Collectanea Antiqua," vol. ii., which may be used also as a guide to the valuable collection referred to. In his later days geology was Mr. Bland's favourite study; and the chief metropolitan museums received from him, from time to time, presents of rare fossils from the neighbourhood of Hartlip and Sittingbourne.

THE BOROUGH OF BELFAST.

FROM the Borough Surveyor's statistics, we learn that 25,155*l.* have been spent during the past year on public works, such as sewers, and the new markets and slaughter-houses. Many of the leading streets have been recently sewered and paved in a permanent manner, and three large arterial sewers have been made to relieve the Pound Burn, which has reduced the frequency of the floodings in the lower districts.

The new cemetery and slaughter-houses are now in full operation, at a cost of about 25,000*l.* Two new public parks are about to be laid out, lands containing 250 acres having been acquired. The new Town-hall is rapidly progressing. Two new covered markets have just been opened. A dead house and coroner's court have been erected, and the handsome Albert Clock Tower is all but completed, so that Belfast is keeping pace with other towns.

THE SEWAGE QUESTION.

Birkdale.—At a recent special meeting of the local board, for the purpose of considering the report, and also the necessary plans and sections, prepared by Messrs. Reade & Goodison, of Liverpool, for a system of sewerage for the district of Birkdale, Mr. Goodison read a long report, entering minutely into the subject, and describing the general character of the district, and the nature of the land through which it was proposed to carry the sewerage. After setting forth the objections to a sea outlet, the report pointed out the advantages that would be obtained by adopting an inland scheme, by which a large area on a flat and extended district would be commanded, and provision made (at a future time) for utilising the sewage by irrigation, into which question the report entered at some length. The cost of the carrying out of the whole of the proposed sewerage works, including tanks and approaches thereto, but exclusive of the land, was estimated at 9,520*l.* 3s. 9d., including 10 per cent. for contingencies. The report then traced out the source along which it was proposed to carry the sewerage, to the outlet in Fine Jane's Brook, into which the sewage would empty itself, and concluded by earnestly impressing upon the Board the economy of taking prompt and immediate steps for the execution of the proposed works, as delay would entail not only a greater cost to the township, but the development of buildings would be seriously retarded. The report was formally approved of, and ordered to be printed.

Watford.—At a special meeting of the Local Board of Health, Mr. Humbert has reported that he had an interview with Mr. Stone, the tenant of Cassio Bridge Farm, who had mentioned the terms on which he was willing to give up possession of the farm. The amount of compensation he asked for was 1,000*l.*, and the quantity of land on the farm was 210a. 2r. 20p. The chairman thought the Board ought to know what Lord Essex was willing to do, in order that the Board might release him from his liability to dispose of the sewage. The following resolution, "That the principle of irrigation be adopted for the disposal of the sewage," was carried with

but one dissentient (Mr. Humbert). A committee was appointed to ascertain to what extent Lord Essex is willing to meet the difficulties of the Board, in carrying out the proposed system of irrigation; and also to make definite terms with Mr. Stone, and to take all the steps necessary to carry out the irrigation works.

Southover.—The drainage question here, which has been continually cropping up at intervals for some years past, seems now in a fair way of being settled efficiently, if not to the satisfaction of all parties interested. The plans of the work, prepared by Mr. George Fuller, of Lewes, under the direction of Mr. H. Conybeare, C.E., by order of the Home Secretary, are ready, and tenders for the works are to be sent in on or before the 17th inst. The estimated cost of the work, we understand, is 1,600*l.* The main drain (15-in. pipe) will commence at Spring-gardens, and will run nearly parallel with the Winterbourne stream for some distance, to allow of its being flushed with water at different points. At St. James's-street the drain diverges to the south, and passing through the bottom of that street, goes on to Eastport-lane, and crossing Gardner-street, passes through the gardens between that and the Railway Station, to the south of the Tanyard. It will pass through the south of the Brighton platform, at the station, on to Mr. Godlee's land, and will terminate in the Winterbourne stream, at the same point as does the Lewes Commissioners' main drainage. From this point, the stream will be arched over to the river. The total length of this 15-in. pipe will be 1,100 yards; the culvert, an additional 400 yards. The drain entirely avoids the private grounds of Captain Wyndham, who has been a great agitator in the matter. Another 15-in. drain will commence at the Militia Depôt, and run down the High-street, to a junction with the other pipe, at the corner of Eastport-lane, near the King's Head. A continuation of this, but of smaller dimensions, viz., 12-in. pipe, will run along Priory-street and down Gardner-street, when it will join the main drainage; 12-in. pipes will also be laid down the lane opposite Manor House, St. James's-street, and also through Priory-crescent.

Cheltenham.—The last monthly meeting of the Local Improvement Board was chiefly taken up by a discussion on the irrigation scheme, incidentally arising from an offer to farm a large quantity of the sewage of the town. It was reported by the committee that the works were steadily progressing. The proprietors of the Hester's Way Estate, through which the sewage outfall pipe passes on its way to the sewage farm, at Boddington, had applied to be allowed to take what quantity of sewage they required over their estate of 130 acres, at a charge of 5*s.* per acre per annum, for a term of years; and this application the committee had, by a bare majority, recommended compliance with. Mr. Paul deprecated this course, pointing out that the Board had before received offers at 10*s.* an acre, but that it was not in a position to deal with the subject until they had ascertained the requirements of their own farm. It was rejoined that the Hester's Way proprietors having to pump the sewage to a higher level, were not in the position to pay the same as the farmers living on the lower level, and that by getting the sewage on this higher level, and availing itself of the machinery which the Hester's Way proprietors would erect, the Board would open up to irrigation a large tract at present unavailable. Mr. Paul did not anticipate any difficulty in getting plenty of land in the Vale, and said he believed that the sewage would be found to be worth, not 5*s.* or 10*s.*, but 40*s.* an acre. After a protracted discussion, the recommendation of the committee was negatived by a large majority.

Brighton.—The Council have had a special meeting for the purpose of agreeing on a petition to Parliament for leave to introduce a Bill in the ensuing session authorising the making of the intercepting sewer, &c., for draining Brighton and Hove in accordance with the plan recommended by Mr. Hawkshaw. After a brief discussion, the motion was carried by 26 votes against 9.

Southampton.—At a recent special meeting of the Southampton Council, a report by a deputation sent to Leamington as to the A B C deodorising works there was considered; and the Council afterwards, as a Board of Health, apparently, unanimously resolved "that this Board are willing to adopt the A B C process, and to make such arrangements with the native Guano Company, Limited, as may be agreed upon." The company offered 500*l.* a year, besides a percentage of profits, for the town sewage, on a lease of thirty years. The A B C process, our readers will recollect, means the alum, blood, and clay process.

Norwich.—In an article on the Progress of the Sewerage Works, and an underground visit, the *Norfolk Chronicle* says:—

"There is now no doubt but that, whether successful or unsuccessful, the Sewerage Irrigation Scheme for Norwich must be carried through. All the money authorised to be raised by the Act of Parliament, 75,000*l.*, has been borrowed, and of this sum the greater part has been already spent. In the face of this fact, even the inexorable opposition of those unfavourable to the undertaking must yield; and there is only one question about which they can now concern themselves,—the success or failure of the plan. Hence this is a question continually debated. On the one hand it is urged that the difficulties which are encountered are insuperable; that if the works are completed, when the sewage reaches Trowse it will be impossible to pump it on to the land at Crown Point; or, again, if this is attained, that the result will be, from the diffusion of malaria, the creation to the city of such a nuisance as will doom the continued existence of the scheme. In contradiction to this, it is asserted by one of the most skilful and active of surveyors,—or, rather, of engineers,—that the difficulties which so unexpectedly arose *are* being and *shall* be overcome; that the sewage *will* reach Trowse, and, when there, that it cannot fail to be sent to Crown Point; and, further, that experience *has* proved the innocuous nature of irrigated sewage when spread upon land. Whilst there are these conflicting opinions as to what will be the result of the plan, there are few, perhaps, who have even the faintest idea of the magnitude and character of the works themselves. It is true that the public are too painfully aware, from the unceasing hum of pumping engines, the inconvenience of open trenches, and the huge shaft paraphernalia observable at various parts, that the work is being prosecuted; but of what is going on beneath the surface they are entirely ignorant.

The whole of the works are expected to be in operation before the end of August next, the time at which the original contractor should have completed the works, and as he lost nearly six months on the low-level sewer, it will be highly satisfactory should this expectation be realised.

One word in conclusion. This sketch cannot but confirm the opinion that the work is indeed a gigantic and responsible one, and requires in the person of the gentleman entrusted with its management a combination of no ordinary engineering skill and experience, with a zealous spirit which nothing can daunt. It is a most fortunate thing for Norwich that Mr. Morant possesses these qualities; and, whilst he merits the praise that the committee under whom he acts have so frequently given him, he also deserves the thanks of the ratepayers for taking so grave a responsibility upon himself without calling in the services of a consulting engineer, which could not have been done for a less cost than several thousand pounds. Whilst saying this, we must not forget Mr. J. G. Johnson (the chairman) and the committee, who have taken in hand so unpopular and unpleasant a task, as their evident wish and intention is to have the works carried out in a thoroughly efficient manner, and at the same time at the least possible cost; thus fulfilling to themselves and their fellow-citizens a duty from which none ought to shrink."

A portion of the street in front of the Albion Mills, King-street, has suddenly caved in, leaving a hole 9 ft. deep, 25 ft. long, and nearly the width of the street, and, of course, putting a stop to the traffic. On examination it was found that it was caused by the bursting of the old sewer at the top, and as large quantities of water were being pumped into it from the engine employed at the new works, it had found its way through the bottom and down through the chalk, which it had converted into a puddle, to the tunnel beneath, which was within a few feet of being connected, the men working from north to south, and *vice versâ*, the point of meeting being where the settlement took place. There were seven men at work in the tunnel, who had a narrow escape. Beyond a temporary inconvenience, the new works will be in no way affected.

Oxford.—Mr. Footman, C.E., of Oxford, says a local paper, recently issued a statement which no doubt had considerable weight with the Local Board in its decision last week, a copy of it having been forwarded to each of the members, and it being resolved not to negotiate for the proposed site at Radley, and also to confer with this gentleman afterwards. In his statement, Mr. Footman pointed out that this site was unsuitable for irrigation, which requires a surface "as level as a bowling-green." A very great outlay would be required to render such land fit to receive the liquid sewage in a slowly flowing state. He estimated that to go to Radley would result in a yearly deficit of 2,600*l.* To go to Sandford would probably cost 12,000*l.* more. The latter place was only selected by Sir Wm. Cubitt and others as an outfall for the general drainage, not the disposal of sewage. A sewer 6 ft. in height was required to carry off the rainfall as well as sewage. Mr. Bazalgette thought of going to Iffley, and irrigating without pumping; but this "would not sufficiently lower flood waters below the basements of houses in the lower parts of the city." Mr. Footman thinks this can be done by a plan he laid before the Board in July, and yield a revenue of 1,500*l.* a year.

Hexham.—The Tyne Salmon Conservancy Commission have had under consideration the question of Hexham sewage, which, to the quantity of 70,000 or 80,000 gallons a day, flows into the Tyne; and a letter calling upon the Newcastle and Gateshead Water Company, who are about to apply to Parliament for power to use the Tyne water, was adopted, in which they were strongly urged to endeavour to stop the nuisance.

QUAKERS' NEW MEETING-HOUSE AT OLDHAM.

THIS new structure has a rather ornamental appearance, with a vestibule leading directly to a light, plain meeting-room, and also to a large committee-room at one end of it, arranged for being used separately or for being thrown open as a gallery on special occasions. On either side of the vestibule are placed cloak-rooms and other conveniences, those on the left being solely for the use of female members and attenders. The interior of the meeting-room is fitted up with pitch-pine open seats, wainscoting, and minister's gallery, the latter being in no way different from the other seats except from its being ascended by two low steps; and the whole is capable of seating, if required, from 400 to 500 persons. The floor underneath the meeting-house is fitted up as a schoolroom, well lighted, with class-room and other conveniences. The general contract for the whole of the works (except heating and gas-brackets) was taken by Mr. Emanuel Whittaker, of this town, who has completed the same from the designs of Mr. Peter B. Alley, of Manchester, architect. The cost of the building and fittings, exclusive of the land, is a little over 2,000*l.*

DISINFECTANTS AND DOCTORS.

IT cannot be doubted that it is of great importance that the value and proper use of disinfectants should be rightly understood by all classes, and especially at this time, when there is so much sickness, and with weather so variable as to be specially productive of causes of disease.

Taking, as I do, great interest in anything connected with sanitary work, I was pleased to note a few days ago a special report made to the Liverpool Health Committee by Dr. Trench, the medical officer, upon the value and use of disinfectants. After referring to various kinds in use, such as sulphate of iron, sulphate of zinc, chloride of lime, permanganate of potash, quick lime and charcoal-powder, he comes to carbolic acid, to which he gives the preference, not denying that the others named have their uses, and are of varied efficacy. Of carbolic acid, however, he says:—"It is a positive disinfectant, and quickly destroys or restrains every contagious and infectious virus. It is an antiseptic, and arrests and prevents fermentation and decay. It is used with great facility, and is sufficiently volatile to permit its vapour to reach atoms or germs of disease floating in the air. It is cheaper than chloride of lime, and for out-door disinfection and for the disinfection of privies and drains it is more permanently efficacious," &c.; and the doctor goes into very interesting details of the mode of using and the excellent effects produced by carbolic acid.

Impressed very much by the foregoing from so high an authority, I at once commenced the use of carbolic acid, and recommended it to sanitary inspectors and other officials, and to my personal friends. Judge my surprise to see in your publication of the 18th instant an extract from a series of practical sanitary hints recently issued for circulation by W. Hardwicke, M.D., medical officer of health, Paddington district, in which, after enumerating various disinfectants, a decided preference is given to Condy's fluid, as being the best in all circumstances; whilst it is added, "Burnett's fluid and carbolic acid are poisonous and comparatively inefficient," &c.

In a matter of such moment as the right sort of disinfectant to be used, there ought not to be so great a divergence of opinion between two medical gentlemen of reputation, and holding the appointment of medical officer of health to such important constituencies. What one highly recommends as "a positive disinfectant" which "quickly destroys or restrains every contagious and infectious virus," the other says "is poisonous and comparatively inefficient." When doctors disagree, who shall decide? I should like this very important subject to be ventilated through your columns and illustrated by practical ex-

perience: so that those who, like myself, have not sufficient chemical knowledge to judge for themselves, may obtain information from undoubted sources, and be able to apply and to recommend such disinfectants as are at once safe, inexpensive, and efficacious. This subject is not unworthy the attention of the medical officer of the Privy Council. JOSEPH BRIERLEY.

NEW DRILL HALL AND GYMNASIUM, NEWCASTLE-ON-TYNE.

LIEUT.-COL. POTTER, of Heaton Hall, Newcastle-on-Tyne, has at his own cost erected a building in this town to be used as a drill-hall and gymnasium. The building, which is of brick, and of an unpretending architectural character, is about 130 ft. long. At the east end is a residence for the drill-sergeant; and in addition there are orderly, dressing, smoking, and secretary's rooms, and a large board-room. The drill-hall and gymnasium, which is about 105 ft. long by 50 ft. wide, is open from the ground to the roof, and is divided longitudinally into five bays by cast-iron pillars, which support the roof, and also the timber work of the gymnasium. All the necessary apparatus for a gymnasium is about to be erected in the hall. At the west end of the hall is a gunnery in which will be kept the large guns; and over the gunnery is a gallery for the accommodation of spectators. On the north side of the building is a large armoury and store-room, and also the usual out-offices. There is an open drill-yard, 70 ft. long by 25 ft. wide, at the west end of the building; and at some future time it is proposed to form a tennis court in this yard. The cost of the building, and the fitting up of the interior, will be about 2,000*l.*; and besides this there is the cost of the land, the entire outlay being defrayed by Lieut.-Col. Potter. Mr. Kennedy, of Jarrow, is the builder; Mr. Henry Andrews, the clerk of works; and Mr. Oliver, the architect.

WAKEFIELD MODEL PRISON.

THE annual report of the Howard Association mentions that amongst the prisons lately visited by the Secretary is that of Wakefield, the admirable model of discipline afforded by which is comparatively little known. It is the only British prison which, by the use of *steam-power and machinery*, approximates in its nature the large manufacturing prisons of the United States and the Continent, where the industrial capacities of the inmates are called out to such an extent as, in addition to rendering the prisoners thoroughly practised workmen, secures the not unimportant object of largely relieving the pockets of honest ratepayers. During four years (1865–68) the purchase of trade materials for Wakefield Gaol was 39,794*l.*; the sales (chiefly mats), 47,413*l.*; net profits, after deducting commissions, &c., 7,783*l.*; stock in hand, 16,888*l.* Average number of workers, 1,007; average earnings, 7*l.* 14*s.* per annum. The Governor (Captain Armytage) remarked to Mr. Tallack, "If we did not make mats, we could turn our machinery and labour just as well to other purposes; as, for instance, to the manufacture of steam-engines." Such industrial occupation is most valuable. Why should not idle, vicious, unskilful criminals be rendered industrious and self-supporting? The competition with outside workers is at the worst very little (a few pence or farthings per individual), and the advantage gained to both prisoners and ratepayers incomparably counterbalances it. The treadwheel is retained at Wakefield as a useful resort to fall back upon for intractable prisoners. As such, and *as such only*, it is valuable.

THE "HOLE-BOURNE."

SIR,—Your correspondent, who calls attention to the derivation of this name, reminds us of the wonderful persistence of error. The fanciful and anomalous "Old-bourne" Stow is directly answerable for: it is found nowhere before him. Even he is not consistent, for he calls it "Hilbourne" in one place, and he makes the brook so called to trickle down Holborn-hill, though such a one he never saw, and the derivation and it belong alike to his imagination. The first writer who corrected this was a well-known correspondent of the *Gentleman's Magazine*, "T. E. T.," in May, 1856, and there the subject is completely exhausted. He shows, beyond all question, that the "Hole-bourne" was the ancient name to that important stream which arises from the hills of Hampstead and Highgate, and which has been better known as the Fleet River. He proves this from the cartularies of the monastic houses of Clerkenwell, in which it is frequently mentioned; and he shows, that even the record cited by Stow spells the word in the usual way.

About twelve months ago, in letters to the *Times*, I also corrected the common error, referred to the article by "T. E. T.," and mentioned that there was a stream called "Holbourn" by Sherbourne in Dorsetshire, and it may be noted that the latter name is also in London.

Still writers copy, and even enlarge upon the old error, and it has been reproduced over and over again, in almost every account of the viaduct which bridges the chasm that gives such force and truth to the ancient name, viz., The Brook in the Hollow. As I am perfectly acquainted with every foot of its course, I can certify to the (very) appropriate construction of its name. It is a piece of word-painting.

Your correspondent alludes to the Domesday record as if the present street of Holborn was spoken of; but considering the length of the street, this is too much to affirm. The words in the record, "Ad Holeburne," must allude to the immediate vicinity of the brook; and there is mention of a vineyard (*vinea*). Now, the steep slopes of the western side of the brook are exactly such as would be suitable for the cultivation of the vine. The aspect is nearly south-east, that of some of the best vineyards, and it would also have the indirect rays of the south and western sun.

It is to be hoped that we may not see this venerable relic of erroneous etymology, "Oldbourne," again resuscitated.

J. G. WALLER.

LONDON-BRIDGE TRAFFIC.

PROVISION of extra accommodation for the constantly increasing traffic on London Bridge, which is urgently needed, has been suggested to be supplied by various methods. Amongst them a plan is proposed by Mr. J. Ivison, who, some time since, submitted a design to the Corporation of London for steel or iron bridges for the accommodation of foot-passengers at street-crossings. His design for London Bridge is based upon the same idea—namely, to carry the foot-passenger traffic over the carriage-road. This he proposes to do at London Bridge by a platform of 25 ft. wide extending along the centre of the bridge, with cross-galleries at each end of the platform, which would serve for street-crossings, and with cross-galleries over each pair of piers, to give firmness to the structure. The gallery would be 18 ft. high, clear, and would be supported upon clusters of Corinthian columns. Two spaces of 25 ft. wide would be left on each side over each arch of the bridge, to allow cross-carriage traffic if required. The piers and abutments would be carried up to the top of the structure in Portland stone, enriched with caryatides. The footways on the bridge would be thrown into the carriage-road, and thus provide for six lines of vehicles, the number for which there is space upon the new Blackfriars and the Westminster Bridges.

One objection to this plan is the asserted insufficiency of the foundations of the bridge to carry any greater weight than they already bear.

DE MORTUIS.

IN taking a retrospect of the past twelve months, the old reflection is forced upon us with painful significance that King Death has been busy as usual thinning the ranks of our eminent men in every walk of life. Eighteen hundred and sixty-nine was a particularly fatal year to members of the English Episcopate, and we have also to mourn the loss of a long roll of gifted men belonging to science, art, and antiquarian science; some of them the very brightest ornaments of their professions. To begin with English painters, sculptors, and engravers, the year's obituary contains many well-known names. Among painters, the most eminent was Thomas Creswick, R.A., who may be said to have departed with the old year, his death having occurred within a few days of its close, at the age of fifty-eight. From the age of sixteen, the Exhibition of the Royal Academy had been graced by the presence of his works, and if popularity be an evidence of greatness, Creswick has every claim to that title. It has been said of him that his works, like himself, were pleasant and cheerful, ever taking the sunny view of nature. The opening of the year was marked by the death, at the age of eighty-four, of Sir William John Newton, whose high reputation as a miniature painter gained for him the appointment of painter in ordinary to her Majesty. Robert Braithwaite Martineau, who will be remembered as the artist of "The Last Day in the Old House," was cut off prematurely in his forty-third year, in February. In the following month passed away James Eckford Lauder, R.S.A., who for correct drawing, free colouring, and for general breadth and vigour of painting, had few equals among Scottish artists. Several of his pictures gained great distinction. His "Ten Virgins" and his "Bailie Macwheedle" were engraved by the Association for the Promotion of Fine Arts. For his two Scriptural pieces, "Wisdom," and the "Unjust Steward," he received a prize of 200 guineas, at Westminster Hall. Mr. Lauder was fifty-seven years of age. Within three weeks he was followed to the grave by his elder and still more distinguished Brother, Robert Scott Lauder, R.S.A., born in 1803. His illustrations of the writings of his early patron, Sir Walter Scott, established his reputation as an historical painter. Of these the most popular are "The Trial of Effie Deans," and "The Glee Maiden," while his pictures, "Christ teaching Humility," and "Christ Walking on the Water," are fine specimens of his capacity for a still higher walk of art. The son-in-law of Thomson, of Duddingston, the famous landscape painter, Mr. Scott Lauder, for a number of years subsequent to 1848, directed the studies of the students of the Royal Scottish Academy. His former pupils have recently honoured his memory by erecting a monument over his grave. Also this month (April), died, at the age of fifty-three, Edward William John Hopley, for many years an exhibitor in the Royal Academy. He was the inventor of a trigonometrical system of facial measurement for the use of artists. John Warkup Swift, the well-known marine painter, of Newcastle-on-Tyne, several of whose works have been reproduced in chromolithography, died in May, aged fifty-four, as well as James Basire, the last of the line of the celebrated engravers of that name; and Orlando Jewitt, the eminent architectural wood engraver. Both had passed the three score years and ten. For about a century and a quarter the name and family of Basire have been intimately associated with the Royal Society, the Antiquarian and other societies, and among their chief works were the "Sepulchral Monuments," and the English cathedrals for Gough. Of Mr. Jewitt's last and best work his series of illustrations to Mr. Parker's "Ancient Rome," we have already expressed our opinion, by remarking that these illustrations "have never been exceeded for beauty, and minute accuracy of detail, and will remain a lasting monument of Mr. Jewitt's excellence as an artist and wood engraver." On the 1st of June, after a short but very painful illness, Michael Frederick Halliday was smitten down. He was known in professional and other circles as the artist of "Measuring for the Wedding Ring," and other pictures of considerable merit. A few days after we had to record the demise of Mr. F. Y. Hurlstone, born in 1800, and for many years president of the Society of British Artists. He obtained the gold medal as student of the Royal Academy in 1823, and gold and silver medals at the Paris Exhibition in 1855. His best-known works are "The Prisoner of Chillon" and "Haidee." Edward Richardson, the sculptor, the restorer of the effigies of the Knights Templars in the Temple Church, died in July, aged fifty-seven; William Crawford, who had a high repute as a Scottish portrait-painter, in August; George F. Rosenberg, the landscape-painter, and an Associate of the Water Colour Society, in September. In September, likewise, passed away, in his eighty-fourth year, George Jones, the oldest member of the Royal Academy. This veteran painter, who was familiarly known as "Waterloo Jones," bore a striking resemblance to his military idol the Duke of Wellington, and generally wore a hat and other habiliments such as the Duke ordinarily adopted. John Hancock, the sculptor, whose "Beatrice" of Dante exhibited in the Royal Academy in 1850, and other works, gained considerable reputation, died in October. On New Year's Eve died William Essex enamel painter in ordinary to her Majesty and the late Prince Consort, having reached the age of eighty-five.

If we have lost no great English architect

during the year, several able and useful members of the profession have gone from among us. Arthur Ashpitel, who died in January, was not only an able architect, but a voluminous writer on architectural and archæological subjects, a clever musician, and an excellent poet of the *vers de société* order. He was born in 1807, and studied architecture under his father. Mr. Ashpitel's many valuable works, together with his collection of Etruscan vases, he bequeathed to the Society of Antiquaries, of which he was a member. Mr. Day, architect, of Worcester, died by his own hand, in June. In July we recorded the death of Robert Grace, of Burton-on-Trent, and formerly of Derby. W. F. Farthing, the industrious curator of the Architectural Exhibition in Conduit-street, was found dead in his room on the 20th of this month. Edward Buckton Lamb, the architect of many buildings, died in August, aged sixty-three. The list of surveyors includes George du Noyer, a gentleman holding a high position in connexion with the geological survey of Ireland, who departed in January; Thomas Pickersgill, city surveyor of York, in May; and William Jones, surveyor, of Derby, in December. Among inventors and engineers, we find James Chalmers, who gave us the famous target which bears his name; and John Hulme, the inventor of the self-acting mule. James Simpson, for some time president of the Institution of Civil Engineers, and a very able member of his profession, died at Edinburgh, in April, aged sixty-nine. George Smith, for twenty-four years resident engineer of the Belfast Harbour (aged seventy-seven), and Charles J. G. Macdonald, the superintendent engineer of the London, Chatham, and Dover Railway, died last month. The latter gentleman, whose untimely removal is deplored by a wide circle, was brother to Mr. John Macdonald, who has long held an important position in the establishment of the *Times* newspaper.

In addition to this numerous band of professional men, the year's obituary contains the names of a large number of distinguished characters who were variously connected and associated with science, literature, and art. There died in January, at the age of fifty-six, Charles Robert Weld, assistant secretary of the Royal Society, brother-in-law of the Poet Laureate; in April, John Richard Walbran, F.S.A., aged fifty-two, local secretary of the Archæological Institute of Great Britain and Ireland, author of, among other works, "The History of Ripon" and "Memorials of Fountains Abbey"; and in May, Peter Cunningham, a name well known to our readers from its frequent appearance in these pages, familiarly known also to all who know anything of London; he was the eldest son of the famous Allan, and was in his fifty-fourth year. The British Museum was deprived of two of its most eminent officials in Sir Henry Ellis and Thomas Watts, the latter only, however, dying in harness. The one-while principal librarian was born in 1776, so that he had attained the great age of ninety-three. So far back as the year 1800 Ellis received an appointment in the Museum, he became Keeper of the Printed Book Department six years afterwards, and in 1827 succeeded Mr. Planta as principal librarian, from which post he retired with a pension in 1856. Sir Henry was the author of many standard works, the most notable, perhaps, being his volumes on the Townley and Elgin Marbles. He died in the middle of January; Mr. Watts in September. Amongst the frequenters of the reading-room of the British Museum the varied and great attainments, and the constant courtesy of Mr. Watts, will be long and gratefully remembered. In Professor Beete Jukes, F.R.S., Professor Graham, the Master of the Mint, and Professor Penny, the world of science lost three leading members. Jukes was Professor of Geology to the Royal College of Science, and the author of a large number of useful scientific works. He was born in 1811, six years later than his distinguished contemporary, Graham, whose discoveries and works have been of the greatest scientific importance to the world. Among the most remarkable of these is the law of the diffusion of gases, to which the Keith prize of the Royal Society of Edinburgh was awarded in 1834; his speculations on the constitution of phosphates and other salts, and his discovery of the law of diffusion of liquids, and of the new method of separation known as dialysis, were rewarded by the Copley medal of the Royal Society in 1862. Previous to his appointment as Professor of Chemistry in the University of London, Graham held the Andersonian Professorship at Glasgow, and his successor in that post was Professor Penny, who, within a few weeks, followed him to the grave. Penny had by far the largest practice in Scotland as a consulting and analytical chemist. He had acquired the highest reputation as an authority in every branch of applied chemistry. Professor Penny died in November, aged fifty-two; Graham in September; and Jukes in July. The sudden death of John Bruce, F.S.A., in October, was an event that caused the deepest regret in the literary world, on account of his great antiquarian and archæological labours, as well as of his active kindness and amiable manners, which rendered him dear to all who knew him. Mr. Bruce was at one time treasurer of the Society of Antiquaries, and afterwards one of its vice-presidents. He was one of the founders of the Camden Society, and for many years he had been engaged in the important public service of calendaring the Domestic State Papers preserved in her Majesty's Record Office. Several volumes of his calendar have been printed, and form a perfect model for works of that character. A stroke of apoplexy closed the life of this earnest worker, in his sixty-ninth year. Deputy Lott, who died in July, aged sixty-five, was well known for his antiquarian tastes, and as a prominent member of several societies. John Hodgson Hinde, formerly M.P. for Newcastle, was another eminent archæologist and antiquary, and the author of several able works. He died in November, at the age of sixty-four. The name of Dr. John Hogg, F.R.S., is entitled to mention, as also that of William Williams, antiquary.

The year 1869 has proved remarkably fatal to foreign artists of eminence. The year had hardly dawned when Paul Hent, the celebrated French landscape-painter, was called away. He was struck with apoplexy while at work before his easel on a picture destined for the forthcoming exhibition. Another French artist of merit, Adalbert de Beaumont, died in May. He travelled much in Turkey, Egypt, and Persia, and had studied Oriental art in its most varied manifestations. The famous Parisian sculptor, Jean Pierre Dantan, was also struck down by apoplexy in the month of September. He was called Dantan, jun., to distinguish him from his brother, Dantan, sen., who is also a sculptor, eighty years of age. Jean Pierre was born in 1800, and in early years was, like his brother, a pupil of Bosio. His reputation was gained by what the French call "chayes," *id est*, caricatures in sculpture of notable personages—burlesques in plaster, wax, marble, stone, and clay. He executed the most absurd, but wonderfully clever, statuettes of contemporary celebrities,—Victor Hugo, Lamartine, Balzac, Wellington—such extraordinary boots! Lord Brougham—such a pocket handkerchief, and such a nose! Rossini, Meyerbeer, Count d'Orsay, full of fascination. But though Dantan took delight in caricaturing the defects and weaknesses of his own sex, yet his heart was excellent. A proof of this was his great aversion to execute the burlesque of any famed female artist. He used to say that ridicule remained attached to a woman for ever. Malibran was very anxious that Dantan should caricature her. At length he complied, though unwillingly, and only when she gave him the following written request:—"Malibran has asked the sculptor Dantan, jun., to parody her portrait, in order to give the public an occasion to laugh at her." It was done; but when the great singer saw herself thus, with deficiencies exaggerated that she had not dreamt of, she burst into tears, and this incident strengthened the artist in his resolve never again to show a woman what her "harmonistic characteristics" were. Three years later Marie Malibran died (1835), and Dantan, in a thrill of grief, wrote to her husband, "Laughter is horrible facing death. I have broken the parody to pieces with one blow from a hammer." The sculptor died rich, and proved his generosity and kindness of heart by leaving 20,000 francs to the City of Paris for founding an annual prize at the École des Beaux-Arts; 10,000 francs to the society for aiding painters, sculptors, and architects; and 600 francs a year to his old friend Sebron, the artist. In the following month, Dantan's brother sculptor, Pierre Hébert, to whom we owe the well-known group of "The Child and the Tortoise," joined him. Hébert, who had reached his sixty-fifth year, was the father of Emile Hébert and Madame Léon Bertaus, both of whom have acquired considerable popularity as sculptors. We must add to the list of sculptors the name of Revillon, who died last week in Paris. Among his works are the large statue of St. Paul at St. Sulpice, the allegorical figure of Medicine on the façade of the Hôtel de Ville, and the frieze of the saloon of the Théâtre Français. A talented Frenchman, M. Borel, chief engineer of the works of the Suez Canal, died in October, aged forty-eight, just as that great undertaking had reached a successful completion. Belginm lost Baron Leys, one of her most noted painters, at the age of fifty-four. He was the chief of the Belgian pre-Raffaellites, and so highly did the people of Antwerp respect and honour him that he was publicly presented with a golden wreath at a *fête* inaugurated for the special purpose by the Artistic Club of that city. The gold medal of the Paris Exhibition was on two occasions awarded to him. To the London International Exhibition of 1862 he contributed several works of high merit—"Young Luther singing in the Streets of Eisenach," "The Institution of the Golden Fleece," &c. Germany lost her celebrated painter Overbeck, who died at four score in November, and the no less celebrated sculptor, Baron Schmidt von der Launitz, who breathed his last at the very close of the year, at the good age of seventy-four. His most important work is the monument to the three first printers, Guttenberg, Faust, and Schœfer, erected in Frankfort about thirteen years ago. Italy mourns and throws a memorial wreath over the graves of Tenerani, the sculptor; of Calamatta, the delicate and correct engraver of Raffaelle's masterpieces, and Professor of Engraving in the Academy of Milan, who died there in March, aged sixty-seven; and of her greatest architect, Luigi Poletti, who died also at Milan in September, aged seventy-seven. His last work was to direct the reconstruction of the Church of St. Paul, at Rome, which the Pope desired to have finished in time for the opening of the present Œcumenical Council.

CHOIR STALLS IN GERMAN CHURCHES.

THE German churches are remarkably rich in fine specimens of stall-work. Not only the cathedrals and abbey churches, but even the parish churches abound with examples of this article of church furniture. In England and France the stalls usually date from the fourteenth or fifteenth century; but in Germany they are to be found of every date from the twelfth to the seventeenth century.

One of the earliest examples which we have seen is at Ratzburg, where there are a few stalls of the earlier part of the twelfth century. They are not in their original position, and are in a mutilated state; but they are most remarkable and thoroughly Romanesque in character. The uprights which separate the seats are nearly 1 ft. in thickness, and are ornamented in front by two small columns, adorned with zigzags and cable mouldings.

The stalls in the church of the New Münster at Würzburg, of which we have given an engraving in a former number,* are works of the earlier portion of the thirteenth century. Next in point of date are the singularly beautiful stalls in St. Gereon's Church, Cologne, which are probably not later than the year 1300. They are the earliest we know in which figures are introduced. Here the figures stand upon the ends of the stalls. They are about 4 ft. high, and finely carved. The ends of both stalls and benches are ornamented with early Geometrical tracery, richly moulded. In all those stalls that we have mentioned the *misereres* are quite plain or very simply moulded, and it is probable that the practice of lavishing a large amount of ornament upon this portion of the stall was not introduced before quite the end of the fourteenth century, as all the earlier stalls we have seen are very simply treated in this respect. There is a *miserere* in Henry VII.'s Chapel, which is said to be the work of the thirteenth century, and certainly, at first, it does strike one as looking of that date; but, if carefully examined, it will be seen that the resemblance springs only from the trefoil or clover-leaf being used, and in all probability it is of the same date as the rest of the stalls, which are evidently works of the fifteenth century. Even in the fourteenth and fifteenth centuries the *misereres* in Germany were much plainer than they were in England.

Next to the stalls of St. Gereon's, at Cologne, in point of date, are those of the cathedral in that city. They are most noble examples, and are very elaborate. Figure subjects are used in

* See p. 730, vol. xxvi.

the ends, set in squared quatrefoils. None of these stalls which we have described have canopies over them.

The stalls at Hildesheim (of which we give an engraving) probably date from the second quarter of the fourteenth century. They are very elaborately carved, and the ends are highly original in design: figures are largely used. The end shown in our engraving consists of an emblematical representation of the genealogy of our Lord, or, as it is often called, a "Tree of Jesse." Standing upon the curved stem of the tree are the Virgin, and the archangel Gabriel in the act of annunciation. Between the two is a vase with lilies. The whole composition is graceful and pleasing. The birth of our Lord is represented above in the gablet. Each of the gablets over the canopies is ornamented with a demi-figure in a circle; the soffits are vaulted. The backs of these stalls are hung with tapestry, bearing the date 1602. There are a double row of stalls, numbering in all forty. The stalls in the western choir at Bamberg are of the same date, and are very similar to those at Hildesheim, but they are not so rich. The stalls in St. Mary's, in the Capitol, Cologne; St. Mary's, Oberwesel; the Cathedral, Erfurth; the Cathedrals at Halberstadt and Naumberg; the Dominican Church at Ratisbon; and the eastern choir of the Cathedral at Bamberg, are all good examples of the middle of the fourteenth century.

Of the latter part of the fourteenth century examples are very numerous. We may mention those of St. Andrew's, at Cologne; St. Ludgeri's, at Münster; St. James's, at Rothenburg; in the eastern choir of the Cathedral of Augsburg; St. Godehard's, Hildesheim; and St. Catullus's, at Moorburg (of which we will give an engraving).

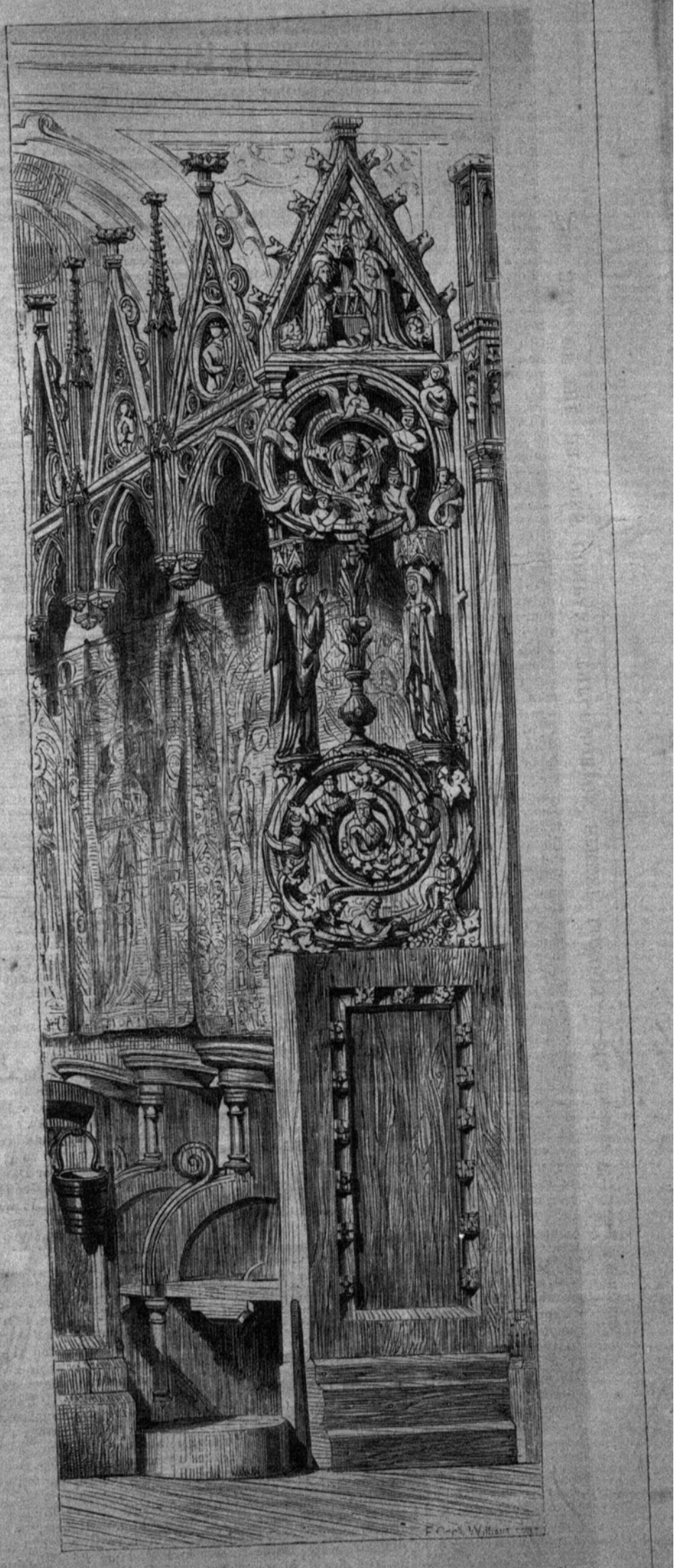
Of the fifteenth century, the examples are still more numerous, and many of them remarkably rich and magnificent; in fact, this seems to have been the century in which this article of church furniture was most carefully studied, and made of even greater importance than its use and position would quite seem to warrant. The superb stalls of the cathedrals of Ulm, Vienna, Munich, Freising, and Augsburg (western choir), and the churches of St. Martin, at Landshut; St. Andrew, at Ochsenfarth; St. Burkard, at Würzburg, amply prove the care and skill which both architects and workmen lavished upon choir-stalls during the fifteenth century.

Examples of the sixteenth century are not so numerous nor so elaborate as those of the former century. The finest examples we know are the stalls in the choir of the Cathedral at Münster, which date from the year 1535. A slight admixture of Italian detail is to be observed in the ends of the benches. In this case there are no canopies. A good example occurs at St. Michael's, at Hildesheim, which were probably erected in the latter part of the sixteenth century. There are canopies over these stalls. Italian detail is largely intermixed with Gothic; in fact, the general effect is rather more Italian than Gothic. In the church of St. Mauritius, at Münster, the stalls are of the same mixed style, and are probably of about the same date.

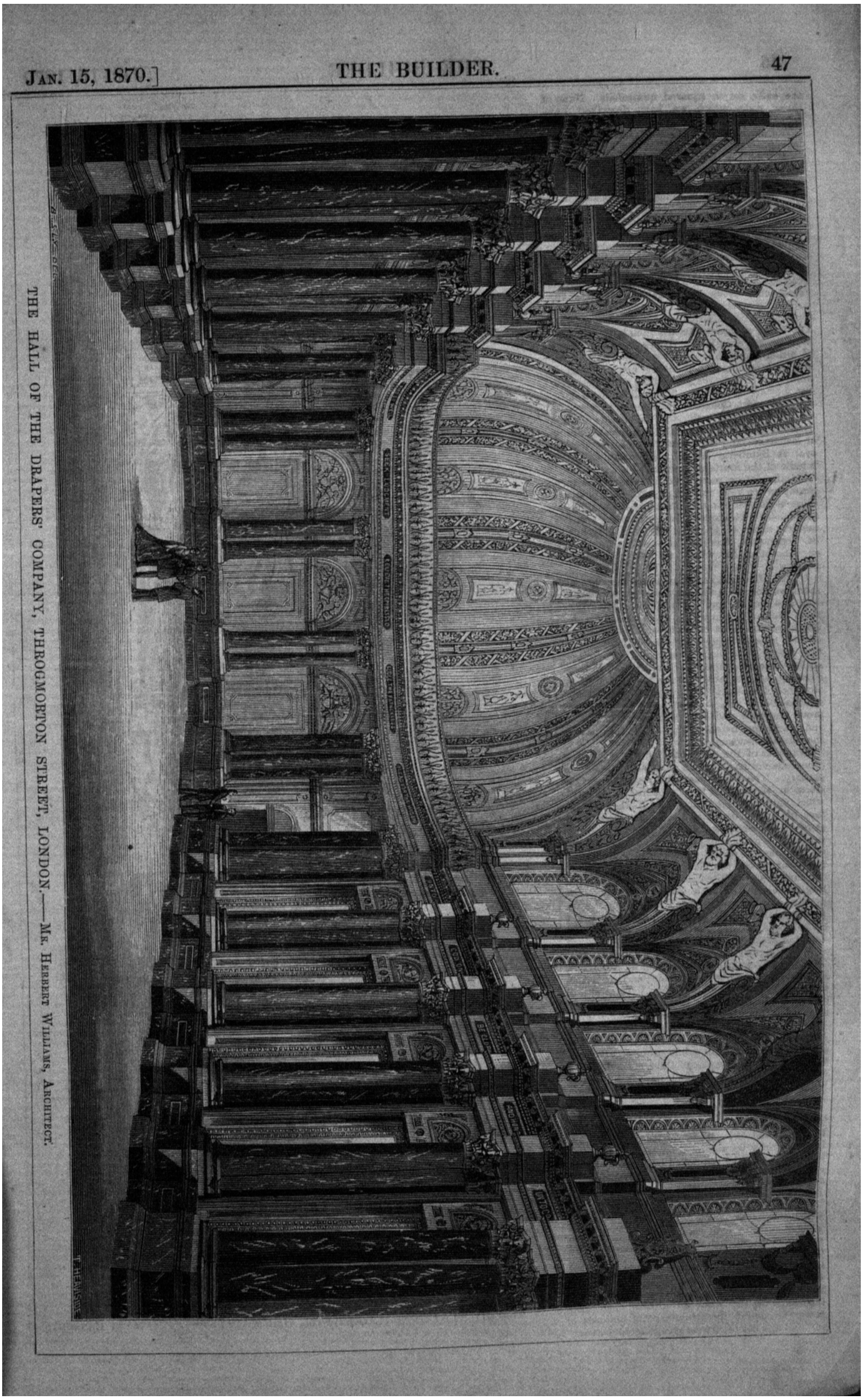
Well-designed stalls of the seventeenth century may be seen in the churches of St. Emmeran, Ratisbon; St. Lambert, Münster; and the Cathedrals of Freiburg and Ratisbon. They are, of course, quite Italian in detail, but still retain the ancient form and arrangement.

In the eighteenth century the stalls became a confused heap of clouds, cherubim, vases, and shells; in fact, anything but architectural features. Horrible examples of these extravagances may be seen in the Cathedrals of Würzburg, Worms, Limburg, and Mayence.

Proposed Education Bill.—The Education Bill proposed by the "National Education League" may be summed up thus:—1. Local authorities shall be compelled by law to see that sufficient school accommodation is provided for every child in their district. 2. The cost of founding and maintaining such schools as may be required shall be provided out of local rates supplemented by Government grants. 3. All schools aided by local rates shall be under the management of local authorities, and subject to Government inspection. 4. All schools aided by local rates shall be unsectarian. 5. To all schools aided by local rates admission shall be free. 6. School accommodation being provided, the State or the local authorities shall have power to compel the attendance of children of suitable age not otherwise receiving education.



CARVED STALLS, HILDESHEIM, GERMANY.——FOURTEENTH CENTURY.



THE HALL OF THE DRAPERS' COMPANY, THROGMORTON STREET, LONDON.—MR. HERBERT WILLIAMS, ARCHITECT.

HUNGERFORD.

I AM afraid I cannot gainsay the generality of the remarks of "Gargoyle" in his letter headed "A Hint to Hungerford," in your last week's issue. The good people of the town seem to have but little spirit of progress; but for what little they do show I think they ought to have credit. The "painful" architecture of the old church must be admitted, and it requires fully three miles of that distance which lends enchantment to the view to render it picturesque among the foliage of the beautiful valley of the Kennet. There is, however, another church, a modern one, designed with taste; it is built of brick, the chief local material. It was erected two or three years ago from designs of Mr. A. W. Blomfield, who is also architect of the Church school now building in the suburbs.

The Wesleyans have also just finished a handsome chapel opposite one of the hotels mentioned, and it forms quite a feature in entering the town from Oxford. It was built by Mr. Philips, of Swindon, from the designs of Mr. Wilson, of Bath, architect.

Last, but not least, I am happy to inform you there is every prospect of the "hideous Georgian town-hall" being swept from the face of the earth this year. The civic as well as religious authorities have been exerting themselves, and in all probability a new town-hall and corn-exchange—not "standing in the gutter," but on a new site opposite the present building—will soon be commenced, the plans for which have already been prepared, at an estimated cost of upwards of 2,000*l.*, by Mr. J. P. Spencer, of Wantage, architect.

I can quite endorse your correspondent's censure of the Great Western Railway Company. The station was burnt down a few years ago, and the goods and cattle shed has ever since been made to serve as well for what the company seems only to consider another class of cattle, viz., the passengers. OBSERVER.

A WORKING MAN ON EDUCATION.

SIR,—The speeches of those who legislate for the people are, in general, of some interest to the community. It may be that their sayings do not show great wisdom or much knowledge. Nevertheless, they are the thoughts and opinions of the men who rule us. Perhaps on no question of the coming session of Parliament will there be more conflicting opinions than on that of national education. For the last half-century this great question has been muddled about,—of great importance for a short time, and then for a long time forgotten. Royal Commissions almost out of number have sat, and evidence has been given that the present so-called educational system is altogether unsuited to the wants of a great nation and the age we live in, as under it not one in four of the few scholars that now attend school receive a fair elementary education. The agitation has not been continuous. It has as yet been by fits and starts; something like a bright meteor, shining for a time, then receding to a glimmer, which gets fainter, until it is entirely lost sight of. Whenever the question has been before the people a large amount of opposition has been called forth. The difficulty has always been the balancing of religious parties; and although they are still at variance as to what catechism or dogmas shall be taught, they are still agreed that rather than an unsectarian system shall be established, in which no party shall have a preference or gain an advantage, they will oppose the new scheme, because it is not denominational. And it is now a question whether the breakers which have wrecked so many movements, and kept the working classes in ignorance, shall again bar the way to a thorough national system. In this new movement I believe its success largely depends on the enlistment of working men into its ranks, who are aware of the deficient state of education, and who are in earnest to help any movement to provide a remedy. I believe the working men, who know the issues at stake, look with dismay on the revival of the sectaries, and of their amalgamation. Hitherto it has been their antagonism which has blocked the way; now it is to be their union. I suppose they now feel the old foundations crumbling beneath their feet, and they know the cracked walls must soon follow. Still they are determined to make another effort to maintain ignorance and inefficient education. The misrepresentations of party papers and speakers are again conjuring up all sorts of imaginary dangers, and are calling loudly for protection to existing rights and vested interests. Quite recently a public man addressed his constituents on the great question of the coming session, and, without doubt, his speech may be taken as a fair *resumé* of the course the Opposition will take when the question comes before Parliament. Although the speech was honoured with a leading article, there never was, in my opinion, a more barefaced misrepresentation of facts placed before the public. The speaker certainly could not have known what he was speaking of, or else he had a very low estimate of the understanding and discernment of his hearers. It must, I think, appear somewhat strange to educational reformers that the advocates for upholding the present system did not think about improvement till the agitation for a national system began; and it is false to state that the League wishes to pull down any efficient school, and build another at the ratepayers' expense, where the one already established is doing its work in a proper manner. The working men's would-be educational friends are, it seems, terribly afraid they should become "educational paupers." It is a great pity the speakers do not give a definition of the word "pauper." But I suppose the word only applies to working men. Some of us know employers who have sons being educated in the Blue-coat School, receiving board, lodging, clothing, and an advanced education free. I wonder whether there is such a thing as middle-class educational paupers. If so, they do not seem very anxious for independence, as I never yet heard of one who objected to his children receiving the advantage of a free scholarship in an endowed college or school. But I have yet to learn, in spite of all that has been said, that, if schools are supported by rates in lieu of fees, and that I, as a working man, pay my share, and my children go to the schools, in sending them I should be a pauper. It appears to me that schools supported by rates are more independent than those that are partially supported by voluntary contributions; and, what is more, they will not be liable to the fickleness and fluctuation of funds, which the present voluntary schools are subject to. Some humiliating tales can be told, of how the present contributions are gathered. The clergyman, in too many cases, is obliged to humble himself to the position of a beggar. I myself once heard one plead to a rich lady for a guinea. He dwelt upon the great advantages of educating the poor; he showed that it promoted law and order; and that it taught them to respect property, and made the rich more secure. I heard the comments of the servants, and I felt even then that a question affecting the well-being of society ought not to depend on the humbling of clergymen or voluntary aid. If the present supporters of schools feel that it is good to give, I believe they can still find the means to aid the ratepayers; and if it cannot be arranged, they can provide rewards for the most efficient scholars. The opponents of the League state "that it is a parent's duty to see that his children are well taught; and if he has to pay for it, he will take care that he gets something good for his money." Only think of a drunken, ignorant parent, who never learned so much as the A B C himself, and who, to gratify his own depraved appetite, keeps his children half-starved, caring about intellectual food! The best of the labouring classes are only half in earnest about their children's education, because they were never taught much themselves, and what they never had or felt the want of, it is plain they will not be very earnest about obtaining for their children. As to the choice of schools, I wonder what power the working man has over the present schools. In the majority of cases, if he does not like one school, or the system of teaching, he is forced to continue at that because there is no other,—he at present has no voice in the election of committee or managers,—so that working men are forced to take that which is not what they desire or want. In this great world of London, schools are not many, but few; nothing is more difficult than to find a school which teaches an average amount of knowledge; and when found there are so many obstacles in the way of admittance: the children must be dressed after a certain pattern; and their hair must be combed straight, not curled or plaited, as that would be imitating their betters. I myself have six children to provide with education; and, although they cost me something like 2*s.* 6*d.* a week, I am bound to admit that I get but a poor return for my money. And, if space admitted, I could tell of some curious things in connexion with the much-vaunted voluntary system. The question is so great, and the issues so vital to the welfare of the people, that in a short letter there is not space to touch one half of the matter. I have not yet stated why I agree with the National League. I think as so many friends are now so concerned about the education of the working classes, and as some of them are talking such queer things about our wants and requirements, the working men should be allowed to say a little for themselves, and ventilate the question from their point of view and experience. And as the social, moral, and educational well-being of the people has always been earnestly advocated in the columns of the *Builder*, I know it maintains with the poet:—

"That they who seek the mind's improvement
Aid the world in aiding mind;
As every great commanding movement
Serves not one, but all mankind."

JACK PLANE.

ARCHITECTS' ACTIONS.

SEQUEL OF A COMPETITION.

Barker v. *Presteign Burial Board.*—This was an action recently brought in the Hereford County Court, by Mr. E. H. Lingen Barker, for the recovery of 50*l.*, for services rendered by him in his profession as an architect. The facts elicited by the evidence may be summed up as follows:—

In 1866 the Burial Board of the town of Presteign invited several architects to submit designs in competition for the erection of two chapels, and eventually accepted the one sent in by plaintiff, on condition that it could be carried out for 700*l.* In due course the plaintiff was formally instructed to make the working drawings, to send a copy of the plan to the Lord Bishop for approval, and to have bills of quantities prepared for the builders; a resolution was also adopted agreeing to the payment of 5 per cent. on the outlay for drawing and superintendence. At the time when the advertisement was inserted in the local papers a strike existed in the trade, so that only two builders came forward, and one of these retired from the field at the last moment. The remaining tender, on being opened, was found to be within the prescribed limit, and inquiry respecting its author (Mr. Edwards, of Leominster) showed that he had just carried out a 3,000*l.* contract to the satisfaction of a London architect and a Government inspector.

Nearly a year's delay now took place, in consequence of an informality in the Board's formation, which necessitated its reconstruction. The seven old members were, however, re-elected, together with fresh ones in the places of two who had resigned. The new Board, at its first meeting, directed the clerk to request plaintiff and Mr. Haddon (the author of one of the rejected designs) to *resubmit* their respective plans. This order, however, the clerk did not obey, but asked plaintiff simply to *send* his plans for the inspection of the Board, "consisting now almost entirely of new members." Plaintiff, suspecting nothing, fell in with this apparently natural request, and sent his plans. Then, without communicating in any way with him, the Board at one meeting rescinded all the resolutions relating to his appointment, and at the next decided upon insisting that Mr. Edwards should find security for the completion of the contract (though no notice of this had been given in the advertisement), and further that he should bind himself to carry out the work for his estimate "without any extras of any description." To the probable surprise and disappointment of the Board, Mr. Edwards agreed at once to these two fresh importations into the case.

The Board then took objection at the next meeting to the sureties named by Mr. Edwards, adjourned for three days, and required fresh names to be supplied in the interim. By the delaying a post, and ante-dating the letter, the clerk is said to have limited Mr. Edwards practically to one day only. Mr. Edwards was absent when the letter arrived, and was therefore unable to send an answer by return of post. The adjourned meeting took place next morning, and a member, named Davies, was deputed to ascertain if Mr. Haddon could reduce the cost of his design to 600*l.* Immediately upon his return Mr. Edwards went to Presteign, prepared with the names of two fresh sureties; the clerk, however, informed him that he was "too late;" that it was needless to name these, the Board proposing to employ Mr. Haddon, instead of the plaintiff. The clerk further said, that the Board wished him (Mr. Edwards) to do the work, so that he had better send in an estimate for the new plans. This, however, he flatly declined to do, observing that he had been "fooled enough already." Two days after this a meeting was held, at which Mr. Davies reported that Mr. Haddon would guarantee that the cost of his design should not exceed 600*l.*; and the clerk also reported that Mr. Edwards had stated to him that he had been under a misapprehension respecting the stone, and finding now that he was expected to provide it, he should withdraw his tender. Mr. Haddon's plans were then substituted for plaintiff's, and advertisements for fresh tenders ordered to be inserted in the local papers. On seeing these plaintiff wrote to the clerk, expressing his astonishment, and demanding an explanation; receiving, however, no reply, he wrote a second letter direct to the Board, remonstrating at having been kept in ignorance of their proceedings, stating that he had fulfilled all his instructions; and that if a cheaper plan was all they wanted, they should have applied to him to reduce the cost of his design. It is not clear from the minutes whether this letter ever reached the Board, but formal notice was subsequently sent plaintiff, "to state the amount of his claim." This he did, his account amounting to 50*l.*; the Board, however, made a counter offer of 20*l.* (to avoid litigation), a sum which plaintiff declined to accept.

The defence amounted to this,—That the contract was made conditional upon plaintiff's finding a builder to carry out his design for 700*l.*, and that he had practically failed to find such a one, inasmuch as Mr. Edwards had not fulfilled the Board's requirements as to security, and furthermore had withdrawn his estimate in the conversa-

tion that had passed between him and the clerk. Mr. Edwards, however, indignantly denied that he had either thought of or mentioned such a thing, while, on the contrary, he was fully prepared to carry out the work and procure the stone as the specifications described, and as he had always calculated upon. The plaintiff's counsel, in reply, argued that even if Mr. Edwards had withdrawn his tender (improbable in the extreme, as it was that he would have chosen the time and circumstances alleged), the plaintiff ought still to recover, because the time when that event was stated to have taken place, was a year after the assurance had been given that the work could be carried out for 700*l.*, and the "conditional" element in the contract applied to plaintiff as well as to defendants.

The judge directed the jury that the points for their consideration were—(1). Had the plaintiff found a builder to carry out his design for the amount named? (2). Had this builder been given full opportunity for complying with the wishes of the Board respecting the security? (3). Did they believe this builder's statement that he had not withdrawn his tender? (4). Had a reasonable, or rather had *any* opportunity been afforded plaintiff for substituting another builder, or reducing the cost of his design?

After a few minutes' consideration, the jury returned a verdict for the plaintiff, and the costs were ordered to follow the result.

Since the hearing of the case, an attempt has been made to procure a new trial on the ground of "excessive damages." The judge, however, without hearing the reply of plaintiff's counsel, refused to disturb the verdict of the jury.

VALLANCEY, THE IRISH ANTIQUARY.

SIR,—I have just seen an extract from your paper in the *Dublin Daily Express* of the 30th ult., headed "Colonel Vallancey," giving a short account of him as the Irish antiquary, and as the Englishman in Ireland devoting his time and attention to the elucidation of the Irish language, and the Irish race. It also says, "The writer made a search through all the metropolitan directories of the three kingdoms, but failed to meet with the name;" and, "strange if his fifteen children and their descendants (supposing they were married) have died out. Perhaps in the Army List or in France some of the Vallancey parent stock, or English or Anglo-Irish descendants, may be found."

As one of the descendants, that is, as grandson of General Charles Vallancey, I now write for the information of the writer of the notice in question.

Of the General's four sons, one only, the eldest son, my father, left issue; he, however, had but ten children. Five of his married daughters left issue; none are now living, though some of their grandchildren are. A sister, a younger brother, and myself, are the only grandchildren of the General's now living. Four sons of an elder brother, deceased, with three of my own, exist to carry down the name of Vallancey. None of the parent stock are to be found in France, for my grandfather alone remained of the ancient and noble family, the Marquis d'Estempes de Vallancey. The General's grandfather had to fly from France on the revocation of the edict of Nantes by Louis XIV. The Marquis and his only son, General Vallancey's father, both died in exile in Flanders, where my grandfather was born. He was sent to England when a child, and brought up by a relation on the mother's side. He was educated at Eton College, and early entered the army. The château and estate of Vallancey, in Berri, were seized by the Crown, and remained in the possession of the Crown until Louis Philippe's time, when they were given by that king to the famous minister and diplomatist, Prince Talleyrand, and are now enjoyed by his nephew and heir, who has been created by the present emperor Duke de Velancey. As regards the valuable MSS. supposed to have been left by the General, and to be in the possession of the family, I have never heard of them, nor do I think they exist, but if such there are, they must be in the possession of my brother, who, from always residing in England, while my lot was cast in India, came eventually into possession of any papers of my grandfather's that existed.

Dinan. G. P. VALLANCEY, Lieutenant-Colonel.

CAMBRIDGE CORN EXCHANGE COMPETITION.

THE six designs received in competition having been referred to Mr. A. Waterhouse, that gentleman reported that he considered, on the whole, the designs of Mr. John Edlin and Mr. R. R. Rowe possess the greatest merit.

"Mr. Edlin's design is in the Greco-Italian style, somewhat similar to that so much in vogue in German railway stations. Its simplicity, its inexpensive detail, its business-like appearance and fitness for its purpose, and its varied skyline are all, as it seems to me, specially commendable points. The exchange itself is rectangular on plan, giving about 9,500 square feet of floor space; the roof is supported by a double row of iron columns, dividing the building into what may be termed a nave and side aisles. There are no galleries. The room is lighted principally by a continuous skylight along the centre of the roof of the nave. This, it seems to me, might prove scarcely adequate to the special requirements of the case; but this defect, if it be one, might be easily remedied by merely increasing the width of the space devoted to glass on either side of the roof, no structural alteration whatever being needful. There are, in this design, no side-lights, except in the gables in the centre of each front, rising above the general line of eaves; each of these is emphasised by a 3-light window.

In the centre of the roof rises a lantern, of wooden construction, square on plan, with a dormer on each of its sides.

Internally the semi-circular roof of the nave has a pleasing effect. Abundant ventilation is provided by a clearstory.

* * * * *

My impression is that this design would prove by far the least expensive to carry out of any submitted to you, and that it could be satisfactorily erected for the sum named,—4,000*l.*"

Mr. Rowe's design is Gothic in style. The referee says:—

"In my opinion, it is, in point of elevation, the most attractive one submitted; at any rate, so far as the main building is concerned. It is pleasing in outline; the ornamentation is not redundant, and the treatment of the walls is good, both within and without, especially the arrangement of the buttresses internally, from which spring the roof-principals. It is proposed to erect the walls in white brick, with a certain intermixture of red brick in the arches, which are all either round or segmental in form. Polychromy is also sparingly introduced in other ways."

"Mr. Rowe submits three schemes. The plan (C) seems to me decidedly the best of the three submitted by Mr. Rowe; it gives nearly 11,000 square feet of floor space.

The otherwise pleasing effect of the interior is, I think, somewhat marred by the diagonal ties of the circular-ribbed principals, which again are disconnected with the tie-beams of the king-post principals above.

The two sets of retiring-rooms seem quite satisfactory in their arrangements, and the vestibules are good.

This design would cost, I believe, nearly 50 per cent. more than Mr. Edlin's."

A design by Mr. Fawcett received special mention.

The report was laid before a special meeting of the town council last week, and after considerable discussion, Mr. Rowe's design C was adopted.

WORKING MEN'S COLLEGE.

NEW ROOMS.

THE winter *conversazione* was held on the 7th inst., at the College, in Great Ormond-street, and on this occasion the new class-rooms, which have been built by Messrs. Haward, from the designs of Mr. Webbe, were thrown open for inspection. These are erected on land at the back of the house in Ormond-street, and are plain in construction, not to say rude. The building is of horse-shoe, or rather magnet shape,—two parallel blocks (with entrance at end of each) connected by a semicircular end, the whole divided into class-rooms which open by an arcade into a narrow corridor that runs round the inner side of the magnet. Some columns, with wide blocks of stone for capitals, in the arcade opening to corridor, afford an opportunity for carving hereafter. The rooms are all lighted from the top, where the large amount of glass will, we fear, under certain conditions of the weather, be productive of inconvenience, and are to be warmed by a stove in the centre of each apartment with a descending flue. Some additional means for the escape of foul air and the prevention of draughts will be needed beyond those at present obvious.

THE METROPOLITAN WATER SUPPLY.

THE Metropolitan Board of Works has been discussing this subject in considering the report of their Works and General Purposes Committee as to it, on a motion by Mr. Freeman,—That the Chairman be requested to seek an interview with the Home Secretary for the purpose of inquiring whether it is the intention of the Government to bring in a measure founded upon the report of the Royal Commission on Water Supply; and also to place before him the Board's general approval of the report. To this motion an amendment was proposed by Mr. Shaw, to the effect that, before seeking an interview with the Government, the Board should act upon the recommendation made to Parliament by the Select Committee of the House of Commons in their report dated 27th June, 1867, on the East London Water Supply Bills, viz.;—That the Metropolitan Board of Works shall have an opportunity of examining the question of *a constant supply* of water, and of communicating with the companies on the subject, for the purpose of applying to Parliament, if necessary. The Board had also the Notice of Motions given by Mr. Roche, on the 17th December, to consider.

Mr. Roche argued at some length against the recommendation of the Royal Commission that the Board of Works should purchase and carry on the business of the water companies. To do this they would be compelled, he remarked, to borrow ten millions sterling, and the annual interest upon this sum, at the rate of 4 per cent., would be 400,000*l.* Rather than incur this enormous expenditure, he suggested that the companies should be compelled to give a constant supply, under the direction of the Board. Practically, any augmentation of the quantity of water now furnished to the higher and middle classes would lead only to waste; and although there was room for reform with respect to the manner in which the poor were supplied, the vestries possessed ample power to compel the owners of property to obtain an adequate service of water. He argued that a constant supply could be obtained from the water companies at a much less cost than by the plan proposed by the Royal Commission. Mr. Newton did not agree in this opinion, and maintained that it was the duty of the Board to affirm the principle, not only that a constant supply was necessary, but that it should be placed under the control of a municipal body. After Mr. Newton's speech, the debate was again adjourned.

We may here remark that Professor Frankland reports that the samples of the Lambeth, Chelsea, and East London Companies' waters, examined by him during the last month, all contained living organisms. The Lambeth water is said to have been "very turbid and unfit for domestic use without previous filtration."

CARLISLE BRIDGE, DUBLIN.

FOR some years past the public have with justice called for the erection of a wide and level bridge in place of Carlisle Bridge, Dublin.

In response, Mr. Charles Geoghegan, architect, has submitted to the public a design for retaining the present structure, and forming lateral extensions to the width of Lower Sackville-street, viz., 153 ft., presenting a perfectly level and uniform roadway throughout.

The estimate, prepared by an eminent firm of Irish engineers, has been furnished for completion of the entire structure within one year, without interruption to the traffic in any way, at 29,000*l.*

The model has been visited by a large number of persons, and the most competent judges of such matters, as well as the merchants, traders, and professional men most interested in the welfare and progress of Dublin, and in all that concerns its facilities for traffic, its architectural beauty, and its pleasantness as a place of residence, have signed a statement of their cordial approval and admiration of Mr. Geoghegan's plan.

THE SANITARY CONDITION OF WAKEFIELD.

IN reference to the complaints to the Privy Council as to the sanitary state of certain parts of the borough of Wakefield, a report to the medical officer of the Privy Council, signed J. Netten Radcliffe, has been made and printed. In a summary, the reporter says;—that the localities complained of (Eastmoor, Westgate Common, certain courtyards in Kirkgate, &c.) were in a highly insanitary state;—that the middens throughout the town are radically filthy; and that there is a want of all proper provision for the removal of their contents;—that great improvement has been effected in the drainage by the completion of the main sewers, but that still much requires to be done for the thorough drainage of courts and alleys; that the state of the Chald and Ings Becks (and Westgate Beck) is scandalous;—that the local authority has neglected in several important respects to carry out the sanitary powers entrusted to it;—that the town is unhealthy, particularly certain low-lying localities, and that this unhealthiness is largely dependent on the insanitary conditions complained of, and upon the imperfect administration of the sanitary laws. Other points are referred to; and the report ends with several provisional recommendations.

THE ARCHITECTURAL EXHIBITION SOCIETY.

AN effort is needed in favour of this society. The council consider that the period has arrived, taking into consideration the increased art education of the public, and the necessity for insisting upon the proper recognition of architecture as a fine art, when a strenuous effort should be made to place the exhibition on a more substantial basis; and this can only be done by obtaining the general assistance of the profession to secure a first-rate exhibition of works in their branch of art, in order that the public may find it as much as possible attractive and interesting, and be able to form a fair judgment of the progress of architecture in this country.

It was anticipated last year, when the Academy took possession of their new premises, that they would have been able to set apart at least one of their galleries for architectural drawings exclusively, and with increased accommodation to provide for a suitable representation of the architectural profession. Such, however, was not the case. Amongst the works exhibited were only *fifty* architectural drawings, representing the works of about *thirty* architects.

It is hoped that the profession generally will now carefully consider whether they desire that their drawings shall be collected together annually for exhibition, or, in a great measure, be omitted from the annual gatherings of art works in London. Unless, however, architects are willing to aid and support this society, the council will reluctantly have, after the next year, to discontinue the exhibition, as they cannot otherwise possibly hope to make it either worthy of the profession it desires to represent, or of the attention of the general public. We make this appeal, therefore, in the hope that the profession will give it its united help. Money is wanted as well as drawings.

THE TOWN SURVEYORSHIP OF LEAMINGTON.

SIR,—I have received the particulars of this vacant appointment as advertised in the *Builder* of this day, and was highly amused to see one of the stipulations as to the engagement, namely, that "the Surveyor must not be *absent from the town* without obtaining the consent of the Board or its Chairman." Surely this advertisement, instead of being headed "*To Engineers*," should have been addressed "*To Men-servants!*"

From such a commencement it would appear a desirable berth for a professional man. C. E.

THE BELLS OF ST. CLEMENT'S CHURCH, SANDWICH.

SOME surprise having been expressed at the sale of the bells to raise funds to repair the Church of St. Clement, Sandwich,—*vide* the *Builder*, 1st inst.,—I have the best authority to state that "the bells were not sold as the *first* step towards the restoration of the tower, but as the *last* desperate resort, when all other means, including a public appeal and subscription-list, had been tried, and the result was not sufficient to cover the outlay."

Moreover, the following passage from "Boys's Collections for an History of Sandwich, 1792," is worth attention:—

"There are five bells, not very tuneable, and consequently of little use but to hasten the downfall of the venerable steeple in which they hang."

And having myself examined them a few years ago, I am enabled to say that they were only fit for the melting-pot. They were made by John Hodson in 1672, and had no interesting inscriptions.

I may add that the sale of the bells, four in number,—one of the peal being retained,—took place in a former incumbency, and that the present vicar, the Rev. Arthur M. Chichester (by whom subscriptions will be thankfully received), "is resolutely bent on the further restoration of the ancient and massive edifice in all its pristine beauty, and declares most strenuously against anything approaching to modernisation." THOMAS WALESBY.

MIDLAND COUNTIES IDIOT ASYLUM COMPETITION.

IN reference to a communication from "Competitor," which appeared in your last issue, I shall feel obliged if you will allow me to say on behalf of the Building Committee that it is their intention to exhibit all the competing plans before the final decision is given, and the award made, unless any competitor should intimate to me, under cover of his motto, his objection to his design being exhibited.

W. G. BLATCH, Secretary.

MEMORIAL TABLETS IN LONDON.

SINCE our last observations on this subject, the Society of Arts have caused tablets to be fixed on houses formerly occupied by Benjamin Franklin, 7, Craven-street, Strand, W.C.; Sir Joshua Reynolds, 47, Leicester-square, W.C.

Leave has also been obtained to affix similar tablets to the former residences of Lord Nelson, John Flaxman, George Handel, John Dryden, Sir W. Blackstone, and Oliver Goldsmith.

IMPROVING THE ACOUSTICS OF A CRIMINAL COURT.

AT the Hereford Sessions, an account has been given of proceedings towards the improvement of the acoustics of the Criminal Court, about the state of which there have been serious complaints. A committee was appointed to consider the subject. They soon ascertained where the mischief lay, namely, in the projection of the gallery and the involuntary noises which a large number of people must necessarily create; making the transaction of the business proper of the Court very difficult indeed. The authority of Sir Christopher Wren on this subject was quoted, to the effect that in theatres and concert-rooms the nuisance of involuntary sounds did not so much interfere with the operation of the sound, because just at the most particular crises the audience were more than usually interested to listen; but in courts of law it is quite different,—the greatest excitement was productive of the greatest noises when the greatest silence was most needed. The first necessity of the plan, it was found, would be the removal of the front seats of the gallery, to enable the space devoted to the official part of the court to be so arranged that there should be no difficulty as to space, and more opportunity to enable the magistrates to get from one part of the court to the other without going out of it,—a plan which had been found to answer well at Worcester, Warwick, and other places. The county surveyor was consulted as to the alterations desirable, and has reported on the subject. The expense he estimates at 500*l.*, which includes the cost of a new gallery and increased accommodation.

CHARLES I.'S WATCHES.

AS "R." in your last number does not seem quite clear upon the story of the watch which was in Ashburnham Church, it may be interesting if I say that the description in your "note" was true, and the only loss, at the time spoken of, was that of the *case* of the watch, no doubt stolen for its "melting" value. The remaining relics were then taken to the mansion of the Earl of Ashburnham, where, I suppose, they still remain.

Mr. M. A. Lower, F.S.A., the late editor of the Sussex Archæological Society's Collections, believes the watch belonging to Mr. W. Mitford, M.P., Midhurst, to be the best specimen. This is engraved in the eighth vol. of the Collections, and an account is given also in the third vol. It was presented to Mr. Thomas Herbert when the king was on his way to execution, and descended from him to the present owner.

W. W. T.

THE author of the "Handbook of Eastbourne" sends a note in which he says, the remaining relics were "wrongfully removed thence to Ashburnham House by the Earl of Ashburnham. I say 'wrongfully,' because I have always understood that the watch and the shirt were bequeathed to the Church, to be exhibited there 'for ever.'"

AN INTERNATIONAL COMPETITION.

PREMIUMS of 1,500 francs (60*l.*) and 750 francs (30*l.*) are offered respectively for the best two designs for a Protestant church, to be erected in Crefeld, Prussia, and foreign architects are invited to take part in the competition. The cost of the building is not to exceed 206,000 francs (8,240*l.*), exclusive of organ and bell-tower. Materials and workmanship cost less there than in France. The jury, of five, includes three architects,—one from Dusseldorf, one from Cologne, and a third of Crefeld. The conditions, plan of site, and lists of prices may be obtained by writing, post-paid, to the "*Presbytère de l'Église Evangélique de Crefeld.*" The designs are to be sent in under motto before the 31st of March next.

ON THE MANUFACTURE OF PORTLAND CEMENT.

BEING in the neighbourhood of Rochester, I took the opportunity of visiting the cement works at Halling, and think the following remarks may be useful to some of your numerous readers. I therefore submit them to you for insertion in your journal.

Portland cement is manufactured from a species of grey chalk quarried from the cliff, and mixed with river mud (generally brought from Gillingham) or clay, and is prepared in the following manner:—The smaller pieces of chalk (the larger being kept for making lime) and a due proportion of mud are placed in a wash-mill, with a sufficient quantity of water to cause them to amalgamate freely; it is then run off into becks, and allowed to settle for a few days. The sediment thus obtained is then conveyed to a drying ground, floored with iron, and heated by flues underneath, where it is allowed to remain for a day or two. When cold, it is placed in a kiln, and burnt into a hard substance, which is afterwards ground into a fine powder in a mill.

The strongest cement is of a bluish grey colour, sets slowly, and weighs about 122 lb. per bushel.

The quick-setting cement is of a brownish hue; owing to too large a proportion of mud, and being not sufficiently burnt is light, turns out weak; and generally flies or bursts the work.

HERBERT W. DALE.

LIST OF SCHOOLS OF ART AND SCHOOLS OF SCIENCE.

WE are constantly asked from various parts of the country, as well as from London, where a School of Art or School of Science can be found. The "Calendar of the Department of Art for 1870," just now published by Chapman & Hall, for a few pence, gives full lists of the various schools in connexion with the Department. It also gives amongst other information suggestions as to the course to be pursued by those who wish to establish a science school or class with the aid of the Department, and memoranda for secretaries.

DETERIORATION OF LEAD PIPES.

MY attention has been called to your paragraph on the "Deterioration of Lead Pipes," which deserves particular notice, as I have no doubt there are many instances of the kind which pass undiscovered. I have just had a closet removed, which was fixed about eighteen or twenty years ago, under the direction of my late father, who at that time had begun to use air pipes connected with the soil-pipe. In regard to the closet in question, it had caused a fearful smell in the house, and no one could discover the cause. On making a thorough examination, I found part of the trap, and the bend beyond, eaten away in the manner you describe. The soldered seam was the part most affected; a 1-in. air-pipe was fixed in the bend of the soil-pipe, and carried up above the roof. I have now put in a cast lead trap, and made the air-pipe 1¼-inch diameter instead of 1 in., as before; but in most cases I think 3 in. not any too large. Rain-water supply had always been used.

S. J. BARBER.

SEWERAGE AND STRATEGY.

HAS it occurred to any of our professional defenders what a very weak joint in our armour Barking Creek would be, supposing an enemy in the Thames advancing upon London? The mouth of that Main Drainage sewer is the very key of a position, upon which is rested the safety of our great metropolis. With this stopped up, a shocking flood of pestilence, and an eruption of unutterable gases, would invade every house and blow up every highway; and it is not very difficult to imagine the possibility (in time of war) that the ship's crew of some rapid and impregnable iron-clad might, by a *coup de main* at Barking, fling back our accumulated river of sewage upon unhappy London by merely destroying certain machinery and flinging the *débris* into a tunnel.

Ought we not to take in peace some precautions against so frightful a possibility of war? Should not a strong defensive work fortify some spot on those desolate and olfactory Essex marshes, so as to hinder a sudden descent upon our main sewer? Or, better still, considering the health and comfort of gunners, should we not make surer of the defences already in existence at Tilbury and Chatham, with, perhaps, the addition of a stationary turret-ship in the Thames, handy enough to serve as a floating fortress, by way of strengthening this weakest point in the defences of London? M. F. T.

A SUGGESTED NEW ROAD: LONDON.

SIR,—The site for the new buildings of the Post-office Department in St. Martin's-le-Grand is now cleared out, but is as yet unbuilt on. Is it too late again to suggest, what has been sometimes before mooted, but perhaps never under circumstance more favourable than now?—the formation of a new street due north from the centre of the dome of St. Paul's Cathedral, and which should be carried to the junction of Old-street-road and Goswell-road, by the Charterhouse Gardens. This street, if of adequate width, the Post-office new building on one side, with the buildings of Christ's Hospital, St. Bartholomew's Hospital, and the Charterhouse, or its successor on the other, with such other public buildings as so great an opportunity would invite on either side, and with the beautiful outline of the noble cathedral at the end, might be made the finest street in Europe, and of equal convenience with any. It need not all be done at once; but let all new buildings to be erected be so planned as to suit that arrangement, allowing the present old buildings to remain, to be removed as circumstances may favour.

A. B.

THE FLEET DITCH.

WILL one of your correspondents kindly inform me how the old Fleet ditch was brought under or over the Regent's Canal? When this canal was constructed,—I think, but I forget the date of such construction,—the old ditch, which I well recollect as a boy at Camden-town in 1840–42, ran as a rather pretty country stream, getting a little *sewery*, though, past the gardens of the Old Castle Tavern, Kentish-town; plashed down a very deep arch at the end of what is now Clarence-road; and emerged again at the corner of Pratt-street, running through Goodall's grounds (Messrs. G., the card-makers); and again going under by the Elephant and Castle, reappearing at Battle Bridge road. How did the Regent's canal, which cuts the Camden-road, interfere with the course of the venerable, albeit dirty, stream? Was the stream culverted under the canal, and where, or taken up by pipes?

Though the source of the Old Fleet is given generally as at Hampstead, there is a very good-sized branch which rises at Highgate, near the Cemetery, flows through the Fortess-terrace fields, and joins the larger branch at Mansfield-place, Kentish-town. We juveniles, twenty-eight years ago, looked upon the Old Fleet with a sort of mysterious awe. CAMDEN.

THE WORKMEN'S INTERNATIONAL EXHIBITION.

THREE meetings were held on the 10th inst. to promote this exhibition. The first was a conference of delegates of workmen from different parts of the country, and also including delegates from Odessa, Belgium, and Switzerland, which was held at the rooms of the Society of Arts, John-street, Adelphi. After the conference, a number of the delegates and other friends of the movement dined together at Mr. Carlo Gatti's new establishment under the arches of the Charing Cross Railway Station. Mr. Thomas Hughes, M.P., presided at the dinner. In the evening a public meeting was held at Exeter Hall, in furtherance of the object in view, when various appropriate resolutions were passed.

At Cambridge, on Friday evening in last week, a public meeting was held at the Guildhall to take into consideration the objects of the proposed exhibition, and the appointment of delegates to attend the conference in London. Mr. Charles Edward Brown, deputy-mayor, presided, and the body of the hall was crowded. Mr. Fowler, M.P., addressed the audience.

A NEW PIANOFORTE AND MUSIC ESTABLISHMENT, DUBLIN.

THE opening of Messrs. Cramer & Co.'s new pianoforte gallery and music warehouse, 15, Westmoreland-street, Dublin, has been inaugurated by a *déjeûner*, at which a large number of friends were present. The new establishment has been erected in Westmoreland-street, on the site of that formerly occupied by the firm of Marcus Moses & Co. The front is of a mixed style of architecture,—Italian-Gothic, with modifications. The upper portion is built chiefly of white and coloured bricks, pierced by circular hood windows, with limestone dressings, head mullions, and carved bosses, resting on limestone pillars, with foliated capitals. The arcade of the upper floor is one series of limestone columns, with ornamental capitals. The entire front is surmounted by a cornice of the same stone, supported on large consoles. The shop front is composed of two large polished mahogany sashes, with plate-glass windows; the porch at the entrance is also of mahogany, and the flooring is composed of tesselated pavement. The first wareroom is about 50 ft. square, and from this two broad flights of stairs of eight steps each, under two arches, supported by metal columns, with ornamental capitals, lead into a large wareroom. This, which will be the principal wareroom, is very extensive, and a gallery, 10 ft. wide, runs along two sides of it. The gallery is also supported by metal columns of an ornamental character. This apartment is lighted by clear-story windows from the top. All the pillars are painted in imitation of Aberdeen marble by Mr. Battersby, of Stephen's-green, who is decorating the interior. The roof is supported by circular principals, which are exposed and carved. Messrs. Cramer & Company have opened a communication with a portion of the building that was formerly the Agricultural Bank, and also with their premises in Fleet-street, so that the entire concern is now one of the largest warehouses in the United Kingdom. Mr. William G. Murray, of Dublin, was the architect, and the building has been erected by Messrs. D. Crowe & Son, also of Dublin. The grates, hot-water apparatus, and chimneypieces have been supplied by Messrs. Maguire & Sons, ironmongers. The firm of Alderman Gregg & Son supplied the gas-fittings. The mahogany fittings and counters have been manufactured by Messrs. Byrne & Sons.

Books Received.

Indian Works and English Engineers: A Letter to the Duke of Argyll, Secretary of State for India. By JOHN BOURNE, C.E. Longmans & Co.

THE objectionable treatment of the civil engineers by the Department of Public Works in India, is here brought specially under the notice of the Secretary of State for India.

"I believe," says Mr. Bourne, "that the indignation which has been excited so widely among civil engineers by the charge respecting the receipt of commission—and which most of them believe was intended to be understood in one sense, while not incapable of being explained in another—will do more to awaken public attention to the subject of the physical improvement of India than any circumstance which has yet occurred in the history of that country. Of course, the military officers of the department of Public Works cannot expect that the civil engineers will ever again be able to act with them with any cordiality; and by their intended impeachment of both the probity and skill of an educated, large, and influential profession, they have not merely provoked inquiry into the affluence of their own skill, and the sublimity of their own virtue, but have opened issues they will never be able to close. The railway works which have been carried out in India by English engineers, spite of a few failures in the bridges of one particular line, have been executed in a skilful and creditable manner, and have been completed in the course of a few years, while the whole works of the antecedent century, during which military men have been alone employed upon such undertakings, have been few in number, and, in general, poor both in design and execution—the native idea generally shining through a thin varnish of European art apparently elaborated from books."

The zeal, talent, and sagacity manifested by several of the military officers stationed in India, however, and especially those of the old East-India Company's service, is recognised by the author. Some of them, he remarks, with much technical knowledge, have united an acquaintance with the country and the language which cannot be possessed by new comers, and whose services it would be a public loss not to utilize by some suitable arrangement. But if the work of improvement is now to be begun in earnest, he adds, it is by an organisation of civil engineers, of sufficient strength to be proportionate to the magnitude of the task, that the duty must be performed; and, in general, military men will be most useful with their regiments in the hills, directing them in the construction of roads and works of strategical importance, many of which are required in India, and which the troops, instead of wasting their time in idleness or dissipation, should be induced to undertake, under the direction of their officers.

A Practical Treatise on Metallurgy, adapted from the last German Edition of Professor Kerl's Metallurgy. By WILLIAM CROOKES, F.R.S., &c., and ERNST RÖHRIG, Ph. D., M.E. In 3 vols. Vol. III. London: Longmans, Green, & Co. 1870.

REFERRING to the favourable remarks on the second volume of this valuable work which we made in a leading article on May 15th, 1869, we have now to announce the publication of the third and last volume, which treats of Steel, Fuel, and the Materials for Furnaces; and contains a Supplement, including a Glossary of Technical Terms, and a classified Index. The volume is illustrated with 145 wood engravings.

This work supplies a want long felt in England, of a complete and practical treatise on metallurgy. Although the authors have taken the excellent treatise of Professor Kerl as the groundwork of their labours, they have given much practical information and many useful processes which are not to be found in Kerl. This additional information brings up the treatise to the present time. This is especially the case in respect to steel.

From so elaborate and detailed a work it is not easy to select anything like a fair specimen. We may condense, however, a few of the remarks on the manufacture of steel given in the outset.

Steel from Pig-Iron.

Steel may be produced from pig-iron:—

1. *By oxidising Part of its Carbon.*—This oxidation may be performed at a *glowing red heat* and at a *melting heat*. On exposing suitable pig to a continued glowing heat with an admission of atmospheric air (Tunner's, Weber's, and Lohmann's methods), the resulting steel will be cheap but variable in its properties. We may here also mention the method introduced by Herrzeel and Paulis, in which it is proposed to heat pig-iron in contact with steam, and Eaton's method of heating pig-iron together with carbonate of soda. The oxidation of the carbon in the fused pig-iron may be effected by the application of blast (the production of natural steel in open fires, and Bessemer's process), or of air draught, which is employed in the production of puddle steel in reverberatory furnaces. Steam is seldom employed, in which case (Sabatier's method) the oxidation of the carbon takes place chiefly through the formed oxidised iron. When producing natural and puddle steel special fuel is employed for melting down the pig-iron and for keeping up the fused state during the conversion process; whilst in Bessemer's process the required temperature is sustained by conducting blast into the fused metal, thus causing an oxidation of iron and carbon. The oxidation of the carbon in the fused pig-iron may be effected also by an addition of oxidising substances, such as pure rich iron ores, &c. The most important is Heaton's process, in which nitrate of soda is used as the oxidising agent. Uchatius has produced a steel adapted for various purposes by melting in crucibles granulated pig-iron with roasted magnetic or spathic iron ore, and a small quantity of oxide of manganese. By varying the proportions of metal and ore, and especially by the addition of a certain quantity of malleable scrap-iron, a softer or milder steel may be obtained. Tunner doubts the value of this method, as the result is uncertain, and also as the crucibles are more wasted or corroded than in Chenot's method. Obuchow produces cast-steel by melting pig-iron with magnetic iron ore, titaniferous iron sand, malleable scrap iron, arsenious acid, saltpetre, and clay, or by fusing pig-iron with an addition of magnetic iron ore and arsenious acid. A more uniform production may be obtained by replacing the iron ore by finely divided heated pig-iron, and fusing it with finely divided pig-iron which has not been heated, and with an addition of brown stone.

2. *By Fusing Pig-Iron in Admixture with Wrought-Iron.*—This principle has been advocated by Karsten. These methods yield a more uniform product than the methods invented by Chenot and Uchatius, supposing that suitable raw materials have been applied in both cases. We may here mention Obersteiner's method, which is adopted at Gefle in Sweden, &c., and which consists of a fusion of pig with wrought iron; and Cowper's method, consisting of a fusion of pig-iron with wrought-iron, and with an addition of oxide of iron and ferro-cyanide of potassium. Price & Nicholson's method consists in melting malleable iron with refined metal. Mr. Siemens has applied his regenerative gas furnaces to the manufacture of steel from a mixture of cast and wrought iron on the open bed of the furnace; this (known as Siemens-Martin's process) undoubtedly is the cheapest method and allows the production of large masses.

Steel from Wrought Iron by Carbonisation.

This process may be performed either at the temperature of fusion or below the melting-point.

In the latter case the bar iron is exposed to the action of solid or gaseous carbonaceous matter, which operation is termed cementation; soft puddled steel is sometimes also cemented, to render it richer in carbon and harder, if the steel is intended for the manufacture of rails, &c.

Various methods may be employed. The methods of producing the Indian cast-steel or wootz, the real and imitation Damascus steel, &c., may be mentioned. Wootz is made from malleable iron cut into small pieces, which are charged in quantities of 1 lb. weight in clay crucibles, with about 10 per cent. of dried wood. Mushet melts wrought-iron in admixture with coal and manganese. Farrar used an admixture of sal-ammoniac, ferro-cyanide of potassium, and manganese (method of the Damascus Steel and Iron Company of New York); Heath uses carburet of manganese.

Howell's homogeneous metal is the softest and most tenacious kind of cast-steel; it is poorest in carbon, and stands between hard cast-steel and soft iron, as fine-grained wrought iron stands between puddled steel and soft iron. Homo-

geneous metal is most frequently produced by melting very pure malleable iron with one-fortieth or one-fiftieth part of charcoal powder; it is also produced by melting pure malleable iron in small pieces with about 50 per cent. in weight of scraps of cast-steel, or by melting wrought iron with an addition of spiegeleisen; the homogeneous metal sometimes results from the Bessemer process. In the form of plates, and applied to coating vessels, it resists the action of sea-water better than iron plates, and is also employed for the manufacture of rails, tubes, &c.

Verdie terms half-steel (*produit mixte*) a product fit for rails; the inside consists of wrought-iron, and the outside is coated with cast-steel.

Classification of Steel according to the Treatment it undergoes.—Steel produced by any of these methods is more or less uniform, and is rendered homogeneous either by the operation of fusion, when it is termed *cast-steel*, or by a repeated welding and forging or rolling, in which case the product will be called *shear-steel*. The term cast-steel is also now and then applied to the inferior sorts of steel obtained by melting pig with malleable iron or with oxidising agents, &c. Cast and shear steel may be equal in tenacity and hardness supposing both to be produced from good pig-iron; on the other hand, a more homogeneous product results from melting than from welding and forging, if an inferior pig-iron has been employed in its production. An improvement of the cast-steel is attempted by the addition of certain substances, thus producing, according to the nature of the addition, platinum steel, silver steel, tungsten steel, &c. Steel which shows a pattern upon etching a polished section with acids, is called damasked steel. The additions given to the steel either do not act at all, or only in such a manner as to remove injurious substances, such as sulphur, silicon, &c., with which they combine and become scorified; this is especially the case with manganese (Heath's patent); the additions seldom enter into the steel.

Classification of Steel according to its Applications.—Steel intended for the manufacture of tools is produced from the best kinds of raw or cement steel, which may be refined either by fusion or by welding and forging. Steel requiring a certain hardness combined with great tenacity for cutters, &c., is produced from welded cement steel produced from Swedish iron, in preference to cast-steel, which is employed in the manufacture of objects of less importance. In the manufacture of tools it is very necessary always to employ the same quality of steel, which explains the preference given to the approved modes of production, though they are more expensive. This is the reason why in England Swedish iron is still employed for the production of the best kinds of cast-steel; the cemented bars when broken into pieces are carefully sorted and fused as quickly as possible in clay crucibles, but not in plumbago crucibles. In Styria the shear-steel produced from raw steel is also more expensive than cast-steel: it is said to possess more tenacity than cast-steel and equal hardness. At present the puddle steel produced from good charcoal pig-iron has in many cases entered into competition with the raw and cement steel, especially when the steel is intended for the manufacture of tools. As these sorts of steel are worked into the most various small objects, and are also drawn out into very thin dimensions, thus increasing their value very considerably, the application of a superior quality, containing a larger amount of carbon, is required; otherwise the repeated heatings required will extract too much of the carbon, and render the steel too soft. Cast-steel is often employed instead of iron for large castings, when it must be cheap, only slightly hard, homogeneous, and ductile, so as to allow an easy treatment. These kinds of steel are not worked into smaller objects, and the castings are usually finished in the steel-melting works. Puddled steel is usually employed as the material for this kind of cast-steel; also steel produced from melting pig-iron with malleable iron, and steel produced from pig-iron with oxidising agents, especially Bessemer's steel, are largely employed. Cast steel will always be superior in quality if produced from superior raw material of constant composition. In most cases the somewhat more expensive puddled steel is preferred to Obersteiner's steel, and almost always before Uchatius's steel, as it yields cast steel of greater homogeneousness. Bessemer steel, however, is preferable to the puddled steel for the production of large masses, as being more homogeneous, cheaper, more quickly produced, and requiring no remelting in crucibles. Siemens's steel and Heaton's steel are likely to enter into competition with Bessemer's steel.

Mr. Bessemer, we observe, however, has just patented a series of further improvements.

Miscellanea.

Acquirement of Property for Liverpool Corporation Improvements. — Mr. J. J. Aston, Q.C., and a jury, have awarded compensation for certain property and land, situated at the corner of St. Anne-street, and south side of Great Richmond-street, opposite to St. Anne's Church, and consisting of dwelling-house, warehouse yard, and a building, formerly used as a brewery. Only a portion of the property in question was sought to be acquired by the corporation; but the claimant being empowered by the Act of Parliament, called upon the corporation to take the whole, which consists of about 910 yards of land. The witnesses called in behalf of the claimants were Mr. Wylie, Mr. Wordley, and Mr. Hornblower, who estimated the land with the buildings at from 4*l.* to 4*l.* 4s. per yard, the total value, including the value of the buildings as old materials, being variously estimated from 4,515*l.* 3s. to 4,607*l.* 15s. 3d. For the corporation, Mr. Rayner contended that the land was worth no more than 30s. per yard. Mr. Walter Scott, valuer, said that the value of the slip of land actually required by the corporation, at 2*l.* per yard, including the damage done to the building, and 10 per cent. for compulsory sale, would be 701*l.* 16s. Assuming the whole to be taken, he valued the land at 30s. per yard, and the building in its present state at 1,162*l.* 2s. 6d., which, after deducting the ground rent, made a total of 2,648*l.* Other and similar evidence was given. The jury returned a verdict for 3,000*l.*

The Serpentine.—Great complaints are being made as to the slow progress made towards the levelling and purification of the Serpentine. At present little more has been done than to draw off the water and expose the filthy decayed vegetable matter which has so long formed the bottom of the lake. It was at first intended to clear away the whole of the mud, which ranges in depth from 2 ft. to 12 ft. over the whole area of some forty-two acres, level it to a uniform depth of about 5 ft., and cover it with concrete similar to that used for the ornamental water in St. James's and the Regent's Parks; but upon the water being drained off, it was discovered that this plan would be too expensive, and it was consequently determined to remove the greater portion, though not the whole of the mud, and cover the bottom with a mixture of gravel and London clay. In future the lake will be supplied with water from the Chelsea Waterworks, and there will be an outlet communicating with the main drainage, and the sewers which formerly used to empty themselves into the lake have been diverted.

Failing in of a Mine in America.—A serious catastrophe is reported from America, A coal mine at Stockton, Pennsylvania, caved in, the shaft and tunnel filled up with earth, and the entrance to the mine choked up. Two dwelling houses were carried down a distance of 40 ft. at the time the earth fell, and the persons in them instantly killed, their bodies being buried in the ruins. Several men who were in the mine at the time are doubtless dead. Ten persons thus far are known to have been killed. The disaster is ascribed to working the mine too near the surface, there being a thickness of only 20 ft. of earth between the foundations of the houses and the mine.

London Association of Foremen Engineers.—By the official report presented at the last annual general meeting, it appears that this institution now numbers 108 ordinary members, all principal foremen of engineers or principal mechanical draughtsmen, and 61 honorary members, mostly engineering employers; whilst the funds invested for all purposes are equal in value to 1,479*l.* 10s. Mr. J. Newton, of the Royal Mint, was unanimously re-elected president for the eleventh time. As the objects of the association are exclusively scientific and benevolent, it is impossible to do other than approve them. At the eighteenth anniversary festival of this society, to be held on the 19th proximo, at the City Terminus Hotel, Sir William Fairbairn will preside.

The National Education League.—A meeting of representative working men has been held at Birmingham, to confer with the officers of the Education League. Mr. G. Dixon, M.P., presided, and in his address said that in all parts of the kingdom the League was supported by the Liberals, and, as a rule, its opponents were Conservatives. He asked the 20,000 Birmingham men who voted for the Liberals at the last election to join the League, because there was great doubt in the House of Commons as to the wishes of the working classes regarding the question of education. A large number of trade-unionists and other working men took part in the discussion, and an almost unanimous approval of the plan of the League was expressed. Mr. Joseph Chamberlain, chairman of the executive, spoke of the "vexed question of Bible reading," and said that the League did not make the Bible a text-book. The subscriptions have now reached 50,000*l.*, and the members of the League number 9,000.

The Disposal of the St. Pancras Schools at Leavesden.—The Poor-law Board have now determined to add St. Pancras to the Central London School District, and have required the managers of the West London School District to purchase the Schools of the St. Pancras guardians at Leavesden, near Watford. The Board state that they propose to unite the parishes of St. Margaret and St. John, Westminster, to the parish of St. George, Hanover-square, which will introduce an additional number of children for whom accommodation will have to be provided; and whilst the schools proposed to be erected at Ashford were intended to provide accommodation for only 600 or 620 children, the Leavesden school will accommodate 700 children. The builder's contract for the erection of the schools at Leavesden is 37,545*l.*, only about 4,000*l.* more than the architect's estimate for the Ashford schools. The schools at Leavesden may be completed so as to be ready for occupation in the course of four or five months.

The Contracts for the Oswestry New Reservoir.—Mr. Coker, of Clapham, was the successful tenderer for the new reservoir, having agreed to make it for 850*l.*, whilst his five competitors asked, one of them above 1,100*l.* more than he had done, and the next above him 600*l.* more, the tenders being, respectively, as follows: Mr. J. Ward, Whittington, 1,450*l.*; Mr. Hardacre, Chester, 1,481*l.*; Mr. Jaynes, 1,455*l.*; Mr. C. F. Lewis, 1,952*l.*; Mr. H. Roberts, 1,817*l.*; and Mr. Coker, 850*l.* Mr. Coker, however, discovered that he had left out an item of 410*l.*, and wished to amend his contract to 1,260*l.* The council resolved to offer it to Mr. Ward for 1,200*l.* Failing this, Mr. T. E. Minshall, C.E., is to examine the specifications and estimate of the borough surveyor, Mr. E. B. Smith, and report to the council. It is asserted that the surveyor could save the town at least 200*l.* on the transaction, if allowed to employ the men for the local Board.

Fall of a Warehouse at Liverpool.—The north end of a warehouse in Harrington-street, Liverpool, has given way, falling on a two-storied office used by drysalters. A warehouseman, the only person in the office at the time, was buried under the *débris*, but was dug out after two hours' hard work, much injured, but alive. The body of another man killed by the catastrophe was also dug out of the fallen ruins. It is believed that a large quantity of bags of rice stored in one of the upper floors was the proximate cause of the disaster.

The Accident at Abbey Mills Pumping Station.—The sufferers by the recent sewage inundations at Blackwall, caused by the explosion of the air-chamber at the pumping station of the Metropolitan Board of Works at Abbey Mills, have received a communication from the clerk to that Board stating that they "cannot agree that the Board is in any way to blame in respect to the late accident at Abbey Mills, and the Board must decline to admit any legal responsibility."

The Bishop of Exeter's Palace.—Mr. John Hayward, of Exeter, architect, having been employed by the executors of the late Bishop to survey and value the dilapidations, and having met Mr. Goddard, of Lincoln, on the part of the present Bishop, the sum awarded for dilapidations amounts to 571*l.*, which sum includes repairs to the old town wall (which was purchased only a few years since), as well as the other boundary walls, the stables, and entrance-lodge.

City Commission of Sewers.—On Tuesday, the City Commissioners of Sewers held a meeting at Guildhall, under the presidency of their chairman, Mr. Deputy De Jersey. Mr. Hudson, the surveyor, reported the value for rating purposes of the premises of Messrs. Negretti & Zambra, on the Holborn Viaduct, to be 960*l.*; those of Messrs. H. B. Fearon to be 1,460*l.*; and the vaults of Messrs. Fearon, beneath the Viaduct, to be 360*l.* The assessment of various houses in Leadenhall-street, Billiter-street, Newgate Market, and Rose-street were materially reduced by the Commission. A letter was read from Mr. Turner, clerk of Cripplegate Ward, inclosing a resolution, passed at the late wardmote, as to the advisability of setting back eight houses opposite St. Lawrence Church, in Gresham-street, for the purpose of facilitating traffic there. The subject was referred to a committee, as was also that of widening Upper Thames-street, by removing the vestibule of Allhallows Church. The Metropolitan Drinking Fountain Association, through their secretary, Mr. Lee, asked leave of the Commission to erect a granite fountain in New Bridge-street, Blackfriars, near the entrance to the railway station, the cost of such being about to be defrayed by a lady.

The Peabody Estates at Stockwell.—Mr. George Peabody, having made various endowments for the benefit of the working-classes of the City of London, made a third endowment of 200,000*l.* Part of this he proposed to convert into land, and purchased between thirteen and fourteen acres of land at Stockwell, of the London, Chatham, and Dover Railway Company. Sir Curtis M. Lampson acted for Mr. Peabody, as Mr. Peabody could not hold land; purchasing it with money supplied by Mr. Peabody; but this did not give any legal or equitable title. In consideration of the sum of 15,625*l.* the company made over to Sir C. M. Lampson 13a. 1r. 14p. of land, with certain premises and hereditaments, lying southward of the London, Chatham, and Dover Railway at Stockwell, and 3r. 9p. of land adjoining the before-mentioned land. It has now been formally decreed that, Mr. Peabody being an alien and not naturalised, the property in question belongs to the Crown. The Crown, it is understood, will hand it over to the Peabody Trustees with a sound title.

Destruction of the Old Star and Garter, Richmond.—The original building of the well-known Star and Garter, Richmond, has been destroyed by fire, and unfortunately the new manager lost his life, having perished in the flames in the attempt, it is said, to save a favourite dog of his brother's. It was fully two hours before a supply of water could be had. When the hydrants were at first opened, it was discovered there was no pressure at all; hence it was necessary to communicate with the water authorities at Battersea, eight miles distant from Richmond, and, as the fire occurred by night, there was no means of bridging this distance by telegraph or rail, and the only way was to ride on horseback. When the necessary pressure came, the engines at once proceeded to work, but by that time the fire had got complete mastery of the whole of the old building. Very little damage comparatively has been done to the new hotel adjoining. The building was insured. Nothing satisfactory has been ascertained as to the origin of the fire.

Great Central Gas Consumers Company. At a special general meeting of the shareholders of this company, Sir Thomas Gabriel, the chairman, stated that by the proposed Bill the directors were to take power to increase their capital by 30,000*l.*, with borrowing powers to the extent of 7,500*l.* more, as also to pay a dividend to the shareholders at the rate of 5 per cent. per annum for the 31st December last out of their net profits, and appropriate the balance to the defalcation account; that system to be continued till the whole of the defalcations were cleared off. These amounted originally to 71,149*l.*, but at Midsummer there was a surplus of 32,507*l.*, which reduced them to 38,642*l.*, and that sum they proposed to pay off.

Patent Laws.—The patent laws have been discussed at a meeting of the Manchester Institution of Engineers. The meeting unanimously passed a resolution affirming that "the trade in inventions which is founded upon the grant of patents is of great advantage to the country in promoting its industrial prosperity, and that any abuse which exists in the present system may be rectified by available amendments."

The Sunday Lecture Society. — This society, organised to provide for the delivery on Sundays in the metropolis, and to encourage the delivery elsewhere, of lectures on science,—physical, intellectual, and moral,—history, literature, and art; especially in their bearing upon the improvement and social well-being of mankind; have arranged a series of thirteen lectures, which will be given at St. George's Hall, Langham-place, commencing Sunday, the 16th of January, when Dr. W. B. Carpenter, F.R.S., will treat of "The Deep Sea: its Physical Conditions and its Animal Life:" Dr. Carpenter will also lecture on the following Sunday;—Mr. J. Beavington Atkinson, on "Raffaelle and Michelangelo;"—Dr. T. Spencer Cobbold, F.R.S., on "Fossils and their Teaching;"—Mr. R. H. Horne (author of "Orion"), on "The Old English Mystery, Miracle, and Morality Plays;"—and Mr. J. M. Capes, M.A., on "The Fine Arts in their relation to Natural Beauty and Moral and Intellectual Perfection," will follow. Lectures are promised also by Professor Huxley, Mr. Norman Lockyer, Dr. Hodgson, Mr. A. H. Green, M.A.; Rev. Professor Lewis Campbell, M.A.; Rev. Allen D. Graham, M.A.; and the Hon. Auberon Herbert, M.A.

The Thames Embankment Approaches. Mr. Bazalgette, engineer, has reported to the Metropolitan Board of Works that it seems probable the Thames Embankment and roadway to the Mansion House, as well as the Metropolitan District Railway to Bread-street-hill, will be ready to be opened to the public in the course of the coming summer. The only approaches at present sanctioned by Parliament are the Whitehall-place, the Craven-street, Villiers-street, and the Norfolk, Surrey, and Arundel Street approaches. He recommends that Mr. Webster be requested to give a price for forming these approaches in macadam, as he has the contract for forming the rest of the main road. He also recommends that Mr. McKenzie be instructed to lay out and level the several plots of vacant ground, and to purchase and plant trees and shrubs, and to prepare the ground for the same in the course of the ensuing spring.

The Hotel de la Vrilliere.—At the last meeting of the Institute of Architects Mr. J. Hebb, associate, alluded to the proposed rebuilding of the Galerie Dorée of the Banque de France (formerly the Hôtel de la Vrillière), in Paris (concerning which observations have already been made in the *Builder*), and suggested that the council should communicate with M. Labrouste, who had reported in favour of the preservation of the present structure. Professor Donaldson, in reply, said that it was not considered advisable for the Institute to interfere in such matters out of England.

Sir D. Coutts Marjoribanks's House.—A dinner took place at the Whittington Club, Arundel-street, Strand, on the 8th instant, to celebrate the completion of a mansion built for Sir Dudley Coutts Marjoribanks, bart., in Park-lane, Hyde Park. The chair was taken by Mr. Charles Long, clerk of works, and the vice-chair by Mr. Henry Luscomb, foreman of the works. After the usual loyal toasts, the healths of Sir Dudley and Lady Coutts Marjoribanks and family, of Mr. T. H. Wyatt, the architect, and Messrs. J. & C. I'Anson, the builders, were warmly proposed and drunk.

Assistant Surveyor of Works, St. Pancras.—For this office there were twenty-four candidates, of whom three were nominated for election,—Mr. Johnson, of Bradford; Mr. Allam, of London; and Mr. H. H. Bridgman, of London, and late of Torquay. At the election forty-seven votes were recorded for Mr. Bridgman, giving a majority of nineteen above Mr. Johnson, who stood next. Mr. Bridgman was accordingly elected.

The Manchester Education Bills.—A report by the Manchester Education Bill Committee has been printed, in which the committee state that they have prepared two Bills,—an Education Bill and a Compulsory Attendance Bill,—which are to be introduced into Parliament next session. The committee discuss the various provisions of these Bills in their report.

"The Bombay Builder."—In the number for November of the *Bombay Builder* (published monthly), the editor announced that the next issue, which would complete the fourth volume of that journal, would terminate its career. Considering that the subscription was 30 rupees *per annum*, we cannot profess much astonishment.

The Archæological Association of Ireland.—At the last meeting of this active and useful society, the Rev. J. Graves, to whom as honorary secretary it is greatly indebted, read a letter from the Home Secretary expressing her Majesty's pleasure that it should be henceforth called "The Royal Historical and Archæological Association of Ireland," and that the members thereof should be styled "Fellows of the Royal Historical and Archæological Association of Ireland."

Railways in Tasmania.—The old Van Diemen's Land is being traversed with railways. An Act of the Colonial Legislature has just been passed for the formation of a main line of railway through Tasmania from Hobart Town to Launceston, or to some point on the line of the Launceston and Western Railway. The Colonial Government are authorised by the Act to give the company a sum not exceeding 300,000*l.*, or 25,000*l.* a year for twenty years.

The Sessions House, Newington.—The Justices of the Peace have come to the resolution to appoint a committee, with power to obtain plans either from the county surveyor or some other architect, showing the comparative advantages of either a re-construction of the present Sessions House, or of an entire re-building of the courts, the consolidation of the Record Office and Clerk of the Peace's Office therewith being an essential part of either scheme.

Public Mortuary.—The following tenders for the erection of a public mortuary and *post-mortem* room for the vestry of the parish of St. Mary, Stratford, Bow,—Messrs. Hills & Fletcher, architects,—were sent in. Quantities were not supplied:—

Bird	£270 0 0
Alexander	232 0 0
Harris	231 0 0
Wicks & Bangs	217 0 0
Webb & Son (accepted)	210 0 0

Discovery of Roman Remains at Maryport.—A few days ago some workmen, while taking down a dry wall at the Roman Camp, Maryport, found a stone resembling a headstone, bearing a Latin inscription, and the cap of a pillar. The inscription on the stone was almost illegible, but the cap of the pillar was in a good state of preservation.

The Ancient Crypt, near Aldgate Pump. We are told that the ancient remains under the houses at the east end of Leadenhall-street are threatened, the houses being about to be pulled down to widen the way. It is to be hoped that means will be found to preserve what is a very interesting, indeed important, remnant of old London.

Cologne Cathedral.—The central association for completing the cathedral at Cologne has just published a list of subscriptions received between the 1st January and 30th November of this last year, in aid of that work. The total amounts to 181,283 thalers, or about 680,000*f.*

Queen's Hotel, Hanley.—We are asked to say that the sum named in our last as the cost of the building, 15,000*l.*, included fittings and furniture.

TENDERS.

For re-building Nos. 98 and 99, Fetter-lane, for Mr. J. Aston. Mr. J. Grandy, architect. Quantities supplied by Mr. Clement Dowling.

Gooden	£2,935 0 0
Mitchell	2,200 0 0
Cook	2,186 0 0
Newman & Mann	2,166 0 0
Colls & Sons	2,156 0 0
Wilson	2,070 0 0
Kebble	2,064 0 0
Foster	1,997 0 0
Manley & Rogers	1,975 0 0
Aitcheson & Walker	1,945 0 0

For roads at Gipsy Hill. Mr. John Leaning, surveyor:—

Waterfield	£592 0 0
Spencer	589 0 0
Hancock	582 0 0
Wilson	567 0 0
Strickson	560 0 0
Emery	471 0 0
Harris	466 0 0
Morris	455 0 0
Thompson	454 0 0
Williams	446 0 0
Cole	441 0 0
Jones	418 0 0
Simpson	410 0 0
Young	403 0 0
Steedan & Cook	374 0 0
Gardner	355 0 0
Porter	355 0 0
Coker	347 0 0

For works on the St. James's Building Estate, Hereford. Mr. E. H. Lingen Barker, architect:—

Road.

Sterry	£233	0	0
Morgan	223	0	0
Clifford	180	0	0
Freeman	171	0	0
Evans	121	0	0

Sewer and Water Piping.

Clifford	151	0	0
Evans	125	0	0
Freeman	123	0	0
Sterry	79	0	0

Fencing (First Portion).

Morgan	223	0	0
Freeman	197	0	0
Tovey	176	0	0
Clifford	144	0	0
Evans	106	0	0

The three tenders sent in by Mr. Evans were accepted.

For various works to premises 19 and 20, Coventry-street, Haymarket. Mr. C. Laws, architect:—

Macey	£490	0	0
Saunders	480	0	0
King & Sons	453	0	0
Potter	413	0	0

For St. Chad's Roman Catholic Infant School, Cheetham, Manchester. Mr. Herbert E. Tijou, architect:—

Thompson	£938	0	0
Connor	905	0	0
Turley	856	0	0
Adams & Marshall	796	0	0
Davison	792	0	0

For re-building the "Old Green Gate," Lambeth-walk, S., for Mr. E. W. Russell. Mr. R. Washington Hart, architect. Quantities by Messrs. Maples:—

Marr	£1,666	0	0
Langmead & Way	1,524	0	0
Kelly Brothers	1,467	0	0
Ball (accepted)	1,380	0	0

For altering "Bramley Arms," Fitzroy-square, for Mr. S. Pond. Mr. R. Washington Hart, architect:—

Warne	£273	0	0
Knight	237	0	0

For altering "George Hotel," Drummond-street, for Mr. Best. Mr. R. Washington Hart, architect:—

Knight	£250	0	0

For building warehouse, New-street-square and Plough-court, City, for Messrs. Leighton, Son, & Hodge. Messrs. Wright & Dresser, architects. Tendering on priced schedule prepared by architects:—

	Time. Months.	Per cent. above.	Per cent. below.	Credit for Old Materials.
Clemence	6	10	—	£128
Munday	4	10	—	30
Pritchard	6	7	—	105
Howard	5	—	—	250
Holland & Hannen	6	—	6	400
Myers & Sons	7½	—	7½	50
Keeble	5½	—	5	150
Ashby & Sons*	3½	—	5	600

* Accepted.

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A letter from Messrs. Strode & Co. in reply to District Surveyor of St. James's, reached us too late for consideration this week.—E. P. (we know of no open competition of the kind excepting for India).—R. S. (apply to the architect).—S. H. W. (milk floated down a pencil drawing with a large brush, or even plain water so applied, will "set" it).—J. N.—H. D.—T. D. B.—R. W. E.—W. R.—T. W.—W. S. A. H.—T. F.—E. B.—B. B.—C. W. J.—C. T.—W. & B.—C. W.—J. P. S.—M. P. T.—J. R. H.—W. F. C.—J. D. W.—W. C.—W. A. H.—C. G.—R. G.—W. W. T.—G. F. C.—K. & Sons.—H. W.—J. L.—B. B.—Camden.—H. H. B.—J. S.—F. R. W.—G. N. S.—S. S.—W. F. S.—E. H. L. B.—J. G. H.—H. T. E.

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The Builder.

VOL. XXVIII.—No. 1407.

Examples for the Workshop.

WE have before us a dozen numbers of a monthly journal entitled *The Workshop*, concerning which we will give our readers a few particulars.* The leading peculiarity of this work is its foreign and international character; for it is issued in four languages, with a view to its circulation in different countries in Europe and the United States. Local and even metropolitan building and art news are not of sufficient general interest to warrant translation into the tongues of nations having different sympathies; consequently these do not enter into the scheme. Hence this foreign journal deals with generalities and principles, leaving its claim to recognition to be founded mainly on its illustrations, which need no translation. This is, of course, a wise proceeding, otherwise endless confusion would ensue. As it is, when we come upon such passages in the English edition as "This country possesses the most superb examples of ancient jewelry in the world," the readers of the different translations must disentangle for themselves the kingdom or republic accredited with the wealth in question. Again, no foreigner appears able to master the difficulties of technicalities in the English tongue, and we are, consequently, disconcerted with the intrusion of such words as *stoff* for stuff, *porcellain*, *fourniture*, *ornements*, *balconets*, &c. Apart from shortcomings of these kinds, arising from its international character, we must pronounce the work worthy, and likely to be useful. The French decimal system of measurement is adopted for the scale of the illustrations. The aim of *The Workshop* is admirable. Artificers of all kinds, and of all the lands in which the four leading languages are understood, are exhorted, from every possible standing-point, as they have often been exhorted before, to

"Be not like dumb driven cattle,"

but veritable artists in the crafts they practise. The *Builder* is put under contribution frequently for information of cosmopolitan interest, we perceive, always with due acknowledgment. Each article contains one upon a topic of general interest, and no more, and this, contrary to frequent Continental practice, is unsigned. This is followed by about a dozen illustrations of objects of art industry, and supplemented with a large folded sheet of details. The objects depicted are of the most varied assortment a furnishing warehouse could produce, ranging from a punch-bowl to a pulpit; as well as of structural use, such as ceilings, chimneypieces, parapets, and summer-houses. We will take the contents of the first number as a specimen. The opening article is entitled "Our present Need;" then follow designs for ornamentation, a memorial stone, a centrepiece, a carved ebony sideboard, a seal and paper-cutters, a modern "Moresque" carpet, a modern ceiling in stucco, wrought-iron grilles, specimens of simple wood sawings, modern articles of jewelry; and after these illustrations come a quotation from the *Builder* relating to archæological excavations in Rome; a recipe for a coat of oil on cement, a note of experiments made by the French Government resulting in the knowledge that zinc when used in cisterns is apt to dissolve, and recommendation that all water-tanks on board ships should be lined with tin, and word of museums for art and industry contemplated in Dresden and Cologne; and finally a great sheet of details opening out wide enough to cover a large space on a joiner's bench. Looking carefully down the leading columns to discover what "our present need" is supposed to be, we find the writer divides it into four branches:—1. The repudiation of naturalism; 2. The extermination of all extravagances and follies; 3. The formation of a sense of the beautiful; and 4. The improvement of the artisans themselves into artists by schools of art in as many places as possible. He says "the actual condition of matters connected with industrial art is so critical that extraordinary measures must be resorted to for its regeneration." He compares taste to the "sick man" known in all continental as well as insular circles, and declares, in the words of our own poet, that there is something rotten in the state of Denmark, thereby implying degeneracy in art, and no offence to the descendants of the old sea-kings. What has been said over and over again concerning the hideousness of the domestic furniture in the houses of the middle and working classes in this country, also applies, it seems, to that of all the lands in which the *Workshop's* four languages are spoken. Explaining the present position of taste and art, the writer remarks:—

"In ordinary middle-class houses, where the appliances of luxury and art are often unknown, an obsolete Rococo runs off, through all these productions, in a sort of unconscious way, as if it were a thing of course. In tables, chairs, and all articles of furniture in wood, irregularly flowing lines usurp the lines of beauty; and where corners and panels are to be ornamented, a few scrolls are introduced, and that is thought sufficient. On the other hand, in paperhangings, curtains, furniture, stuffs, &c., flowers and leaves of natural form and colour are preferred. It is different when education and luxury, or at least comfort, bear rule. Here, indeed, the Rococo style is also seen, and especially of late: not, however, in mere unconscious existence, but as a style taken up again, and imitated consciously with artistic intention."

But it is this continuous return to old styles and imitations of them that has been the ruin of taste, the author urges. The artistically educated part of the world is divided into cliques, and one set does homage to Paganism, another to Mediævalism; and another, aware of the gulf which separates modern civilisation from the middle ages, cultivates the Renaissance styles. These last have most charms and capacities for him; for in these alone, he believes, is progress possible. Instead, however, of pursuing the road opened out by the great change in art indicated by the term Renaissance, we have wandered from it and got back again to the styles of Louis XIV., XV., and XVI. of France, which are all more or less unconstructive and confused. Moreover, we have gone astray after the art of the Eastern world, with, however, no definite result, except in carpets, curtains, and hangings, to which he might have added, if only as a tribute to the insular popularity of the willow-pattern plate, ceramic wares. He continues,—

"In forsaking the true path, we, the most civilised nation of the world, are grasping after shadows, which constantly elude us, the result being a confusion of styles badly copied or imitated, their characteristic features frequently misconstrued, and adopted more as a matter of fashion, than as a true and living utterance of the necessities and feelings of the age. Their details are often so mixed together that we sometimes see, illustrated in one and the same object, a conglomeration of the world's history, an interval of centuries between its head and foot."

As though such heartless man was not a sufficiency of evil, art is beset with another grief, which is called naturalism. This knack of reproducing natural forms in objects destined for domestic use, the writer speaks of as the suicide of art. The term "fancy articles" applied to such items as miniature hats, or jockeys' caps, serving for inkstands, candlesticks, and match-boxes, he concludes must have arisen from the fact that such devices were the decrepit fancy of some brainless head." And the substitution of one material for another, or the treating one material in such a manner that it resembles another, as when a porcelain vessel is made to look like a wooden tub, brings down equally severe censure. Of course, there is nothing new in these opinions. For the last five-and-twenty years we have taught the same doctrine ourselves; but here we have it couched in such generalities as will be understood and appreciated by the agile smiling Alphonse in the *atelier* of a French manufacturer, as well as by the broad-shouldered, long-haired Ludwig who labours in a German workshop; the olive-skinned, black-eyed Pippo of an Italian studio; and the ruddy, fresh-coloured English workman.

Having drawn about him the difficulties to be encountered in developing or originating a new style, the writer begins to despatch them, one after another, in this fashion:—

"First, we have to contend with that naturalism which now appears our most dangerous enemy. Art must be cut off from the umbilical cord of nature in order to feel her freedom. She must become the mistress, nature the servant who prepares the materials, while at present the reverse is the case. We must arrive at the persuasion that vegetable or animal types are not to be employed just as nature produces them; but that the genius of Art must take up his position as absolute master, and dispose and transform at his discretion. Hence the necessity for conventionalism, from which, however, does not ensue the adoption of any distinctive past style."

Alphonse will lift his shoulders and eyebrows simultaneously with his cap, as conventionalism is thus presented to him, wishing, wistfully, doubtless, for more light. Ludwig will send a thought or two roaming through the nearest museum of art-treasures, to ascertain whether, what he remembers of its beauties, tallies with this assertion. May be, as the Italian faces the conclusion, the gay remembrance will dart into his mind that he has seen it somewhere before, and honest John Brown, with a sigh or a laugh, according to his humour, will admit there is nothing new under the sun. The more we can elevate our pursuits the more pleasure we are sure to find in them; and when our work is pleasure, it cannot be otherwise than pleasant to work, and a large piece of the sting is taken out of our doom to toil. If all producers in the various branches of art-industry come in time to understand the principles upon which they should work, the why and wherefore, as they are familiarly called, the aspect of everyday life will be thoroughly changed.

Among the illustrations there are several that deserve mention, for different reasons. One of these is a summer-house. Here we have an exceedingly picturesque object that is almost unknown in this country; for the melancholy alcoves that are our nearest approach to it give no equivalent for the fresh charm suggestive of Swiss forests and châlets these structures impart to a landscape. The plan of it is cruciform, and the entrance is formed by leaving the end of one of the arms of the cross open. The enclosure is but lattice-work, though the roof is of slate. Details of the ornamental woodwork of the spandrels, &c., are given an eighth of the full size.

We are attracted by a garden-door. It is a simple piece of woodwork formed of laths, arranged at regular intervals, crossings so cleverly notched, with equal precision, as to form a very pretty open-work design. This is a garden-door in the villa of Jussef Bey, Cairo, designed by M. Stadler, of Zurich, with a mixture of Moorish and Swiss sentiment. Ornamental woodwork generally, we perceive, received at the hands of the editors of *The Workshop* much attention, as it behoves dwellers in the neighbourhood of great continental forests to give. Some clear

* The Workshop. Edited by Professor W. Baumer, I. Schnorr, and others. James Hagger, 67, Paternoster-row.

woodwork parapets are shown, and finials, ornamental gable-ends, and crestings in wood are given, as well as many specimens of furniture. Jewelry, too, is somewhat profusely illustrated, and, in conjunction with crystal manufacture, is treated at length in the letterpress of several numbers. Bookbinding and fancy leather goods, patterns for weaving, carpets, and tapestry also find illustration.

The varied nationality of the work results, as might be expected, in some contradictions. Whilst one writer deplores the low ebb or the utter absence of taste at the present day in the industrial arts, another congratulates the world upon the fact that the sobriety of trade has prevented manufacturers in some branches from being guilty of the extravagances that have brought high art low. The chameleon looks blue to one and green to another, whilst a third will declare it is black or white; and the same variations in time and chance apparently conduce to equal diversity of opinion on other matters. But there can be but one mind about the propriety of bringing beauty into the workshop. Alphonse, Ludwig, Pippo, and John Brown will each, doubtless, have his own standard of loveliness, as surely as he knows the secrets of his own heart; but when he has looked upon those of his neighbours, it is tolerably certain he will set to work to make his own higher. As a work that has this end in view, we must commend the journal before us; and we shall best advance its interests by pointing out there is room for improvement in the English edition.

THE GHIBERTI GATES IN THE SOUTH KENSINGTON MUSEUM.

THE Southern Court of the South Kensington Museum has been temporarily reduced in length in order to allow space for the workmen engaged in the prolongation of the building. A screen forms the present barrier, and the occasion of the change in distribution of some of the contents of the court which has thus become necessary, has been seized for bringing together in one comprehensive group the unrivalled collection of electrotypes, copies of famous works of art, in gold-plate, silver, bronze, and other metals, of which the Museum has so good a right to boast.

Chief among these products of an art which must be called yet in its infancy,—though an infancy like that of Hercules,—is the noble reproduction, by Messrs. Franchi & Son, of the famous central eastern gates of the baptistery of San Giovanni at Florence, executed by Lorenzo Ghiberti, during the first half of the fifteenth century. Permission to take gutta-percha moulds of the entire composition was given to the agents of the Museum by the Tuscan Government, when that rule was Grand Ducal. The popular indignation appears to have been roused by the operations of Signor Franchi; opinions being divided as to whether the noble bronzes were being destroyed, or only being prepared for deportation. Those who might have been reassured by the tender care shown by the workmen engaged in the tedious and delicate process of moulding, yet took the practical and thoroughly Italian view, that if copies were sent to England, Englishmen would no longer come to Florence to see the gates. The time-honoured argument "Sirs, ye know that by this craft we have our wealth" prevailed, and the operation was suspended by order of the Government.

Fortunately for us, and fortunately for art in general, there existed in Florence a copy of the gates, in plaster, taken some seventy years ago. Signor Franchi obtained permission to mould this set of casts, undertaking to furnish the Italian Government with a new copy, as that from which he took the moulds would be discoloured by the oil used in the process. The gates have been thus reproduced. The architrave has been moulded from the actual structure. It is the opinion of those who are well acquainted with the gates, that the copy produced from the plaster cast is superior to any which could have been taken from the actual bronze, as seventy years' exposure to the weather, even in the climate of Florence, has produced an effect in the diminution of sharpness of outline which was very perceptible on comparing the copy with the original. It is certain that incipient decay has made its mark on some of the wonderfully rich ornamentation of the architrave, which is faithfully represented by the electrotype.

It may almost be said that it is now for the first time that the English public has the opportunity of seeing this marvellous product of the skill of Ghiberti. Owing to want of space for their fit display, these noble electro-castings have hitherto been inconveniently lodged, and not only hidden from the world, but subject to the hostile action of the damp, which has written its name in unseemly streaks of verdigris over more than one panel. This damage will be removed forthwith, by the use of dilute sulphuric acid, which will be carefully washed off, the moment that the copper begins to show a bright surface. We recommend the results of the experience of Signor Franchi, which is adverse to the use of the sulphate of ammonia, to those who are engaged in the purification of Torregiano's famous *grille*, in King Henry VII.'s Chapel at Westminster.

The frame of the gates, somewhat meagre and poor in its architectural proportions as is generally the case with the woodwork of Italy,—(it is a design taken from a wooden structure, not from one of stone),—is covered with embossed foliage, fruit, and flowers, in *mezzo* and *alto relievo*, of the most consummate workmanship. The forms are taken from the actual *fauna* and *flora* of Italy, and their disposition recalls (and perhaps suggested) that of the pilasters of the Loggie, designed by Raffaelle, of which there are good copies in the Museum. Grapes, apples, nuts, plums, and other fruit, trailing shoots of the vine, and graceful forms of mingled vegetation, are interspersed with sharp-billed birds, with the little Athenian owl in the midst, and an eagle in the centre.

The doors themselves consist of two leaves, each of which is divided into six panels, representing scenes in Old Testament history. Around the panels the border is enriched by alternate busts and whole-length figures, twelve of each to each leaf. The former, and the features of the latter, are said to be contemporary portraits. The likeness of the artist himself, and of his father-in-law, the youngest and the oldest heads represented, are admirable for their force and life, and prove that, if the *Renaissance* had not in the art of Ghiberti attained to the purity of Greek taste, it yet fully rivalled the skill of the noble portrait sculptors of imperial Rome.

The treatment of the panels is essentially that, not of bronze casting, but of *repoussé* goldsmith's work. It requires no small acquaintance with the sleight of hand which may be attained by the cunning bronzist, in the successive or alternate use of wax, and of sand and plaster, in moulding, to allow the imagination to realise the fact that these bold and complicated groups, containing in nearly every instance some one or two figures that seem almost detached from the surface, together with others, of which the outlines are barely indicated by the extreme delicacy of the relief, are really cast, and not hammered or chased.

The pictorial grouping of the designs of Ghiberti differs no less widely from that of work produced under the canons that regulate the art of the draughtsman, as now fixed, than the execution exceeds in its audacity and finish the capacity of the moulders of the present time. Each of the ten scenes represents, not a single incident of the life, but a summary of the entire history, of the patriarch, or sacred hero, whom it commemorates. Thus the first panel, in the upper part of the leaf facing the left hand of the spectator, tells the story of Adam. A cloud of angels, traced with the most delicate touch in a scarcely perceptible relief, shadows forth the song of the morning stars,—

> "When the Creator great,
> His constellations sate,
> And the well-balanced world on hinges hung."

The same figure, majestic in its dignity (although grateful to none but the sensuous southern people in any material presentation), in another part of the composition is raising Adam from the dust. Yet again HE appears lifting the graceful womanly figure of Eve from the side of her slumbering helpmeet. Yet again HE watches the angel who is expelling the fallen pair from the Romanesque gate of their lost terrestrial Paradise. Full as this wonderful sculpture is of repetitions of the same figures, of the human pair, the angelic ministers, and the more awful form of the Creator, the separate and successive incidents of the story are combined in a glorious anachronism, and the magic command over the arrangement of the various subordinate incidents into one harmonious composition is a triumph all the more wonderful inasmuch as it compels us to yield the highest admiration to a work of which we cannot fail to condemn the principle on which it is designed.

The same irreconcileable harmony, for such it must be considered, is displayed, with varying, but almost always admirable, result, in each of the two panels. In each is to be seen the same charming combination of a full relief of some principal figure, approaching to the character of sculpture in the round, with a faint and fairy-like tracery of landscape, or of figures dying into the background of the composition. This combination of the graceful and the bold, of the female and male elements of beauty, may be found in the works of some of the greatest artists of the immortal period of Greek art, such as Pyrgoteles. It is originally, and perhaps essentially, the style of *intaglio*; but its application to *cameo* or relief is natural and appropriate. We could cite Greek gems in which the effect of this mode of contrast is most masterly, but we can remember no instance of Mediæval work, or indeed of elaborate grouping of any age, in which the method has been introduced with such admirable success. Combined with what we have called the anachronism of the simultaneous representation of successive incidents, this unison between two opposite methods of treatment gives to the great work of Ghiberti a charm that is magic and unique.

The second panel gives the story of Cain. We see the first-born infant hanging on the bosom of his mother, while the grand parent of the Hebrew race tills the earth by the sweat of his brow. We see the boys at play, the young men parting to their several occupations, pastoral and agricultural. We see each bring an offering of the fruit of his toil, while the Lord has respect unto Abel and his offering, although unto Cain and his offering he had not respect. We see the very fall of the fatal blow, from the club wielded by a figure of wonderful vigour and life, on the tossed and twisted limbs of the first slain shepherd. We see the questioning as to the murder, and the exit of Cain to wander to and fro on the earth. Again, in the magic grouping of the scenes, we trace the continuity of the story as if told by a series of dissolving views, the rich effect of the entire panel starting into actual life from this wildly blended detail.

The story of Noah is no less fully told. A wonderful air of mythologic antiquity is given to this composition by the presentation of the ark under the unwonted form of an Egyptian pyramid. The window of the sacred legend is open near the summit, and a long wisp of birds streams out, until it is lost in the distant clouds. Below is the no less duly recorded door, by which stand the four human pairs, while a lion and a camel swell out into an attractive relief from the mass of their fellow beasts and fellow cattle. Under a shed that might almost be a piece of *appliqué* work, but yet is redeemed from the poverty of such an effect by the truth of the moulding, lies the father of the vine in sorry plight, his reverent and irreverent offspring lending dignity and passion to a scene that, less nobly rendered, would be grotesque. The same family surround the altar of thanksgiving in another part of the panel; and the mind reverts to the signal of promise and of protection from the sterner moral of the baccanalian lesson.

Abraham bows to meet the majestic three, while Sarah laughs her welcome from the door of the tent. The sacrifice of the promised son, bound and kneeling, in striking relief, on the altar, is arrested by the hand of the angel. Other scenes in the patriarch's history are interposed, and force and richness are given to the composition by the figures of two young men, reclining, in conversation, on the ground, who appear to be the servants left behind by the obedient and faithful patriarch when he laded his son with the wood for the altar.

Jacob, again, appears in every best-remembered incident of his somewhat shifty and ambiguous career. But Ghiberti has removed the stigma from the memory of his mother, Rebecca, by representing a scene, omitted in our present copies of the Book of Genesis, though hinted at elsewhere, in which the Almighty appears to her in a dream, and tells her how to obtain the birthright for the son to whom it was given by promise and by gift. The fair, lithe forms of the daughters of Heth are such as to lead any one whose blood runs with any Lot ripple through the veins to sympathise rather with Esau than with the weariness complained of by Rebecca.

Joseph is illustrated by, perhaps, the least satisfactory of the entire series of designs. A numerous double group in alto-relievo occupies

the lower portion of the panel, the cup being found in Benjamin's sack affording a theme for grand pathognomical treatment, both of countenance and of pantomimic gesture. Jacob is kissing Pharaoh on a dais to the left; but the least admissible part of the composition is an elliptical classic peristyle, inconsistent with the Egyptian scene of the story, within which figures in very low relief, but limned like life itself, are hastily storing up the golden grain of the years of plenty.

Beneath the panels last described is scratched, rather than cut, on the cross moulding, in rude Latin characters,

"*Laurentii Cionis di Ghibertis*
Mira arte fabricatum."

The adjective is, indeed, appropriate.

Moses and Joshua, David and Solomon, form the subjects whose history is illustrated by the four lower panels. In the last, the reception of the Queen of Sheba by the wise king gives occasion for another of those processional or rather theatric, groups of which we cited an example in the story of Joseph. The group compassing the the walls of the devoted city is interesting, from the key which it affords, in the attitude, and Roman helmet and armour, of the captain of the host of Israel, to the personality of one of the helmed statuettes.

It is difficult to identify some of these admirable figures. Besides the Joshua thus indicated there is a very noble shield-bearing draped figure, which probably represents Gideon. As to Samson, powerfully treated in the nude, there can be no mistake, though the pillar by which he stands is conventionalised into a mere symbol. Moses is always to be recognised; David, and probably Ezra, the latter holding a scroll, are intelligible; but there is one figure, a young man, in Roman armour, with his hands lifted in prayer, who has puzzled even the copyists of the gate. His eyes are fixed on a small disc, by the side of the coved niche in which he stands, on which a face, and the indications of wings, seem to denote a cherub. The only explanation that we can offer is that the youth is intended for Samuel, and the disc introduced as a symbol of the Bath Col, or voice which he heard audible in the darkness of the Tabernacle.

Four reclining figures, niched in the upper and under cross mouldings of the gate, rivet the attention by the resemblance which they bear to the awful Morning and Evening of Michelangelo in the Medicean Chapel. The original idea very likely was taken from the ordinary pose of a classic river god, but the marvellous grandeur of these little unexplained statuettes must have sunk into the very soul of the mighty Florentine, who exclaimed that this masterpiece of Ghiberti was worthy to be the Gate of Paradise.

The gates we have described were the second pair executed by Ghiberti for the baptistery. The earlier pair were divided into panels of a very ancient form,—a lozenge intersected by four arcs of a circle,—which had been introduced by Pisano into the pair which he had previously executed. These were subsequently removed from the centre doorway to make room for this second work of Ghiberti, and the three noble gates were thus symmetrically arranged. The date of the work of Pisano is A.D. 1330. Ghiberti, who lived from 1378 to 1455, was occupied on his own gates from his twentieth to his sixtieth year. The earlier pair represents scenes from the New Testament, and the statuettes are those of the Evangelists, the four great doctors of the Romish Church, the prophets, and the sybils. They are described in some detail, although not without errors of considerable magnitude, by Vasari, who does not give any description of the second and more beautiful pair.

A similar combination of the circle and the triangle, or rather the lozenge, is, however, as old as the year 1180, which is the date of the execution, by Bonanno, of the Porta di San Rainero, or gate of Saint Reignier (Renatus) in the cathedral of Pisa, an electrotype copy of which is most instructively placed close by the glorious inspiration of Ghiberti. It will not do to describe, or even to examine, the earlier and more archaic work, after feasting the taste on the exquisite forms wrought out into such life-like beauty by Ghiberti. Let the visitor have the self-command to examine Bonanno's work first. It will well repay minute attention, and the interest which attaches to it in consequence of the precise determination of date, is of the highest order. The unhesitating conventionalism of this twelfth-century modelling is surprising, and yet a sort of vigorous treatment underlies it all. The devil in the temptation, with trifid, bird-like feet, and a tufted tail, the figure being about half the size of that of Christ, is a marvel of impotent monkish fancy. The baptism is conventionalised into an immersion in a sort of bath. In the triumphal entrance into Jerusalem, human figures grow out of the gates of the city and the palm-trees in an Arabesque impossibility, that contrasts very quaintly with the formality of the little figure who is spreading a shirt, sleeves and all, for the ass to walk over. The scenes, twenty-eight in number, all illustrate the life of Christ. Rude letters supplement the efforts of the artist to tell of the cruelty of "Erode" or the raising "di Lazaro." On the frieze at the top is represented the "trisagion" of the *Te Deum*, with wonderfully quaint angels; and the celestial reign of Christ. This gate would be much improved in effect if it were surrounded by a copy of the rude frame, stolen and transformed from a heathen temple, within which the original actually stands.

The gates of Ghiberti have been repeatedly engraved. They are also represented by a photograph in the portfolios of the Art Library. But the most exquisite record of their beauty is from the well-known burin of the Cavaliere Lasinio, in a series of engravings of the panels, published at Florence. Curiously enough one or two of the details of these engravings are incorrect, a helmed figure, in one of the niches, being drawn in a sort of turban; but the general fidelity is remarkable, and the series of prints gives a clearer idea of the work, not only than the photograph, but than can be obtained even by actual view, without prolonged study.

From the quaint, monkish figures of Bonanno, down to the admirable *repoussé* work of the famous Milton shield, almost every stage of excellence in metal work is represented by the electrotypers that are grouped near the gates of Paradise. There is chased and beaten armour from the *ateliers* of the famous Milanese armourers of the sixteenth century, a suit worn by Francis I., adorned by masks of lions, and another still more elaborately wrought suit belonging to the same gallant monarch. There are massive tables, lamps, gueridons, and mirror frames of silver, or of silver and ebony, wrought by English goldsmiths for the seignoral halls of Knole. There, in partially oxidised silver, is a portrait statue of Henry IV. of France, in his twelfth year, an exquisite work of art. There are the Coronation Plate of the English sovereigns, the relics of ancient Roman goldsmith's work, known as the treasure of Petrossa, and a silver table, épergne, and fire-dogs from Windsor Castle. Copies, indeed, they all are, but copies so true to the original, owing to the wonderful portraiture effected by electrotypy, that the difference could hardly be detected by any but the most skilful expert. Let those who would know how the arts of the sculptor, the founder, the modeller, the medallist, and the goldsmith, are but portions of the same plastic craft, pay a speedy and a careful visit to this scene of metallurgic triumph.

WORKS AT THE HOUSES OF PARLIAMENT

SINCE last session several alterations of importance have been made in the interior of the Houses of Parliament, under the direction of the architect, Mr. E. M. Barry, R.A.; and various works, to which allusion has before been made in the pages of the *Builder*, have been carried on to completion. The most striking changes effected are in the central hall, the witness-hall, and the three corridors leading from the central hall to the Commons lobby, the Peers' lobby, and the river-front committee-rooms respectively. Our readers will, doubtless, remember the discussions in the House of Commons last session, on the proposals brought forward by Mr. Layard, the late First Commissioner of Works, for the decoration of the central hall, and its embellishment with mosaics. The result was the reduction of the vote by no less than 2,500*l.*, and the effect of this reduction on the design is very evident now that the work is so far completed.

The dull brown-coloured paint has been removed from the stonework of the central hall and its corridors. The stone has been covered with a preservative composition which will enable it to be washed; and as the composition has in no way discoloured the surface, the whole of the stonework is now clean, and shows the natural colour of the material. The carving has been painted stone-colour, as it was not possible, without great expense, to remove the brown paint from it. The stone archways leading to the Peers' and Commons lobbies, and to the river front, have been enlarged, and light glazed oak screens, with plate-glass above them, substituted for the stonework, in order to admit more light into the lobbies. The windows in the corridor to the river front have been enlarged, and skylights have been introduced into the rooms at the angles of the hall, where gas was formerly necessary in the day-time. In the centre of the groining of the hall an opening has been formed for the admission of light from the lantern above, and in the witness-hall, at the foot of the committee-room stairs, the windows have been widened, and openings made in the walls for the same purpose. The colour has also been removed from the stained glass here and in the Peers' and Commons' corridors, and the effect of the changes generally will be greatly to increase the light in the interior of the building. None of the mosaic pictures are yet completed in the panels allotted to them over the four great archways of the central hall. Mr. E. J. Poynter, A.R.A., is the artist employed for the cartoons of these works of art, which are to be executed at Venice by Messrs. Salviati. One picture, the St. George, is completed, and is now being fixed. The whole of the panels of the groined roof of the hall are filled with mosaics on a gold ground. They represent scrolls of roses, thistles, and shamrocks, interspersed with the royal cypher, crowns, &c. The ribs of the groining have been gilded and decorated to correspond with the mosaics, and as the lower part of the hall is quite white and undecorated, the work at this point appears to be incomplete, as indeed it is, for the reason we have before explained. The architect has already stated publicly that the diminution of the moneys at his disposal was not decided on until after the work of decoration had been commenced, according to his official instructions, at the higher estimate, and he has therefore evidently been obliged to finish the mosaic ceiling, and to leave to a future day the decoration of the rest of the hall to harmonise with it. No alterations have been made in either House of Parliament or their respective lobbies. In the Royal Gallery the eight niches are now filled with statues. Mr. B. Philip is the sculptor, and the statues are wholly gilt, with a very satisfactory effect. The statues represent the following monarchs:—Alfred, William I., Edward III., Richard II., Henry III., Henry V., Queen Elizabeth, and Queen Anne. In the Queen's robing-room, Mr. Armstead is proceeding with a series of bas-reliefs of oak, representing scenes from the "Morte d'Arthur." This fine room, with its frescoes by the late Mr. Dyce, is now nearly completed, and will, we believe, be added to the portions of the palace to which the public is admitted, soon after Easter.

Works are still proceeding in the Royal staircase. The stained glass has been altered to admit more light, portions of the doors have been pierced and glazed, and the four groins at the top of the staircase are being decorated with mosaics. In St. Stephen's crypt, the baptistery has been completed, and inclosed with elaborate wrought-iron gates by Messrs. Hardman, and with this work the restoration of the crypt is now finished. The painted decoration of the baptistery has been done by Messrs. Clayton & Bell. Outside the palace, a work of some peculiarity and importance has been carried out at the north-east corner of New Palace-yard, by the construction of a subway passing under Bridge-street to the north-east angle of the street, close to the Underground Railway Station on the Thames Embankment. The subway is intended not only to afford a safe and convenient means of crossing the crowded street, but is also meant to give access to the Westminster Bridge Station of the Metropolitan District Railway, and also to the steamboat pier. The Metropolitan Board of Works is taking active measures to prolong the subway to the pier, and this work it is expected will be completed before Easter. Nothing, however, appears as yet to have been done by the railway company to connect their station with the new approach. The subway is a continuation of the cloister or arcade recently constructed on the east side of New Palace-yard. It passes under Bridge-street, at a level slightly below the surface of the paving of the cloister. It is in form a passage about 12 ft. wide, with

a segmental arched roof, terminating at each end in a square space covered by a stone groin. One of these spaces, viz., that at the north end, will form the entrance to the steamboat approach. In the middle of the length of the roof of the subway, an opening is made for light and air, so contrived as to exclude the rain, and also to form a refuge, in the middle of the road above, for persons crossing Bridge-street. By night the subway is lighted by gas lamps, fixed to the arched roof after the manner of those used in railway carriages. The interior of the subway presents a glazed white surface throughout. This is not formed of white tiles, which, in such a situation, might fall off, or be liable to accident; but the bricks of the walls and arched roof are themselves glazed so that the white lining of the work forms a part of its construction. The subway is perfectly light, and well ventilated, and will doubtless be found a great convenience by members of Parliament and others who, by its use, and that of the steamboat subway, will be able to pass between the Houses of Parliament, the railway station, and the Thames Embankment, without encountering the risk and inconvenience attendant on crossing a dangerous thoroughfare. Flights of steps lead from the north end of the subway to the level of Bridge-street and the Embankment. The whole work is completed, but no arrangements have as yet been made to give the public the benefit of its use. Messrs. Field & Co. were the contractors for the subway, and for the mason's work generally. The decoration of the central hall has been intrusted by the architect to Messrs. Crace, and Mr. E. C. Pressland is the Clerk of Works. It is intended to have everything except the three remaining mosaic pictures completed before Parliament meets, on the 8th proximo.

A NOTE FROM NORWOOD.

IN the vicinity of the Crystal Palace, where everything is supposed to be in undeniably good order and good taste, we are sorry to say that there are many things which are out of order and in bad taste. Norwood, Upper and Lower, south and north, the New Town and the Old, wants the scavenger and the gutter-cart, the pavior and the drain-maker; but first it requires a few proper road-makers; and last, though not least, it wants a sanitary inspector, who will do his duty (supposing it has one). It is all very well to walk through a few leading terraces or thoroughfares, and express one's admiration of sundry detached villas of a nondescript style of architecture, with garden-plots and borders to match; but when we enter a town in pursuit of our mission, it is not to lounge along its pleasant broadways, but to plunge into its corrugated defiles and back-slums, where nature and human nature are at strife.

Norwood was once an insignificant locality, known mostly through its tales of gipsy life and adventure. Norwood is destitute of monumental interest of the past. It has no crumbling castle-wall, or ivyed ruin, or memorial rookeries. Its hills and undulating vales and streams, and the vestiges of its ancient wood, sacred to gipsy life, alone remain. But acres and acres of fallow have for the last fifteen or twenty years disappeared, and the once gorse-crowned and woody steeps are now crested with the habitations of man. Wandering tribes and flocks and herds have given place to the practical and more domesticated bipeds. Norwood, proper or straggling, to-day, taken as a whole, is a populous district of country; and this growth of prosperity and humanity is owing to the erection and existence of the Crystal Palace.

We do not like to find fault if no fault exist; but we would calmly ask of Norwood folk, are they satisfied that their roadways or footpaths are in anything like proper vehicular or pedestrian condition? Enter the town from either the High Level or Low Level Railway Station, and take the rake of the road from the lower to the higher, or *vice versâ*, and the picture along the line of route, under-foot or in sight, is not sanitary or socially pleasant. The road is in ruts, and the side-channels or watercourses owe more to nature and the elements than to man, for fulfilling their requirements. On the high level thoroughfare the road, it would appear, is making rapid advance to annexing the footpath as part of itself, and both seem thoroughly agreed as to the desirability of the union. The ugly and wretched weather-beaten boarding that encloses the Palace Grounds along the high road, front and flank, gives a most dreary and jagged look to the approaches to the Palace. But we suppose this cannot be helped at present, as it would take more funds than there is a possibility of obtaining to replace it either with a dwarf wall with a *fosse*, or an iron railing. In justice to the directors, it must be said they are, and have been, making strenuous and energetic efforts to render the Crystal Palace attractive to the public, and they cannot yet be expected to do much externally.

Not so with the Croydon authorities of Norwood. They might do much, for there is a large amount of property and wealth concentrated in the town. Buildings are still on the increase on all sides, though there seems to be a large number of houses to let or to be sold.

On the Anerley-road, which, by-the-bye, is wretchedly sludgy and broken, houses are being erected, and the carcasses of others are under the auctioneer's hammer.

Opposite Westow-terrace there is a plot of ground which can well bear the appellation of "nobody's land," and seems to be designed for no other purpose than that "rubbish may be shot here." Mark ye, this "dead dog" land faces the centre of a fine row of shops in a populous and otherwise respectable thoroughfore, a stone's throw from the entrance to the Palace, and about fifty yards from the Royal Hotel. This "nobody's land" is partly paled in about breast high, and is a receptacle for every conceivable refuse and offal—canine, feline, and human. Is it in Chancery, we wonder, or does it belong to some gipsy squatters? But let us pass this plague-spot,—this half-garden and whole sink, and leave it to the tender keeping of the sanitary magnates of Croydon and Norwood proper.

All the facilities exist in abundance for making Norwood, Upper and Lower, a healthy place, but whilst the leading thoroughfares are pleasant in dry weather, the lower quarters of the town, and the dwellings of the humbler inhabitants, are altogether overlooked.

In Norwood New Town, a quarter lately sprung into existence, the streets and lanes show perfect sludge of from 6 in. to 1 ft. in depth. We assert this without the least exaggeration. There is hardly any attempt here at a pathway, and where there is, a wooden edging, with plugging or stays of the same material driven into the earth, keeps the footway and the street from amalgamating. Not a flag or a paving-stone is to be seen in this primitive region, although in one of its lowest depths, 50 ft. below the level of the high road, a "Mission House" of some religious sect broke in upon our view.

Down in this dell, dingle, or defile, with an incline of nearly 45 degrees, the brewer's cart is not unknown, and the signboard is conspicuous, and speaks of the brush, though the streets and footpaths do not.

Without enumerating the streets or lanes by name in Norwood New Town, we may simply and truly say that every thoroughfare in it shows perfect mud and sludge, ashes, offal, and everything nasty besides. It has some lamps, "few and far between," and we suppose when the drain takes the place of the open pool, and the ploughed street is flanked by the flagged path, the apparition of the taxman will not be altogether an agreeable sight to the pioneer inhabitants in this quarter.

Norwood with its surroundings is pleasantly situated: it is easy, and is not overburdened with poor. Its labouring population are mostly connected with the building trades.

If Croydon Local Board wishes to do its duty, it should pay a little more attention to the roads, footpaths, and drains in Norwood and Anerley; for we believe it has the local government of a portion of this latter district in its hands also.

Apropos, we see that there is an announcement that tenders will be received for the construction of sewers by the Croydon Local Board. It is to be hoped that some of the first constructed will be in the Norwood and Anerley district.

Crossing-sweepers in tender years, of both sexes, are in abundance in every quarter of Norwood, and the visitor is sure to be importuned to a degree that may either soften his heart or stiffen his knuckles to a demonstration. This, after all, is but the winter result of gipsy waste labour, and the hands that cannot work or pilfer must need respectfully beg, with a broom half-mast high, and a curtsey for "ye lady and gentleman."

Our desire has always been to see respectable homes for our poor and working classes; to see their homes properly constructed and ventilated, with a plentiful supply of pure water and the free air and sun of heaven flashed in upon the walls and floors of the poor man's home. No labour spent by us in this direction will be misspent or distasteful.

In taking a brief survey of Norwood district it strikes us that the field of building operations has been overrun, not only in the town but in and near the adjacent districts of Forest-hill and Sydenham. A lull must naturally intervene for a short while; but it seems certain that all the places enumerated will again rapidly extend themselves in area and population, on account of their situation.

The railway accommodation between London and Norwood is pretty good. Complaints, however, are not unheard on the score of the fares. Reductions are now taking place; and facilities enough exist for sightseers visiting the Crystal Palace from either the West or East end.

WILLIAM ESSEX.

THE arts of enamelling and engraving require so much skill and judgment in their highest applications, that men who have thus successfully applied them have always been accorded artistic honours, and by none were these ever more fully deserved than by the subject of the present memoir, for the art of enamel-painting never attained a higher degree of perfection than at his hands. William Essex was born in London, August 1, 1785. His father was a watch-dial painter and bookseller, in Clerkenwell, and in the former capacity gave that direction to his son's talents which grew to an ambitious desire to extend the application of enamel, and to transcribe the great master-pieces of art in this imperishable material, so that faithful records of them should be preserved, long after the more fragile oil-colour, canvas, and panel should have succumbed to the injurious hand of time. The book department of his father's business enabled him to gratify his love of reading, and to enrich his mind with poetic and artistic lore, and was also the means of introducing the young aspirant to Flaxman, Brayley, Britton, and others, with whom his father was intimate, and who encouraged his early efforts and remained his steadfast friends.

As a child, William Essex was delicate and sensitive, and this delicate and nervous temperament was his through life. It is not surprising, therefore, that he exhibited a taste and talent for music, playing both violin and flute extremely well; nor that, at one time, music as a profession should have almost shaken his allegiance to painting. As a youth, he had very little formal instruction in art; he was, however, placed for a brief period with a very excellent enamel and glass painter of the name of Muss, but his success and skill were more due to his own talent, industry, and perseverance. The *technical* excellence of his work at the commencement of his career may in a great measure be ascribed to the chemical knowledge of his brother, Mr. Alfred Essex, who prepared the *plates*, compounded the wonderfully choice colours, and *fired* the paintings; but his brother's health unfortunately failing, the whole onûs of enamelling, technical as well as artistical, latterly devolved upon him. He had furnaces built at the back of his house in Osnaburgh-street, Regent's Park, and henceforward attended to the *firing* and the entire chemistry of enamelling himself. His earliest enamels of importance were small and delicately-finished portraits of George IV., executed for Messrs. Rundell & Bridge, jewellers to his Majesty. These brought him Court notice. He afterwards painted for William IV. and Queen Adelaide, and continued to exhibit from year to year at the Royal Academy and elsewhere. Thus he gradually gained many kind and influential friends and patrons among the nobility, and was introduced by the Duchess of Gordon to paint for the Princess, who, on becoming Queen Victoria, made him her enamel-painter in ordinary.

His portraits of the Queen, his Royal Highness the late Prince Consort, and other members of the Royal family, are very numerous, and he executed very many of the enamels for that regal and interesting historical series of portraits from Henry VII. to the present time which adorn the chambers of Windsor Castle. He also painted many works for Samuel Rogers, and received great assistance, kindness, and

attention from the poet. It is in such works as are exhibited in the Plumley Collection at South Kensington that his wonderful skill is most apparent,—in the "Ecce Homo," "The Cottage Toilet," Puck, Gervatius, the Virgin, &c.—transcripts in which the very touch and *impasto* of the originals are faithfully rendered. Sir David Wilkie was so pleased with the rendering of "The Cottage Toilet" that he painted a picture of Sancho Panza on purpose for our enameller, whose copy of it was purchased by the Duke of Buccleugh. "The Young Lambton," after Lawrence, and "The Strawberry Girl," after Reynolds, also show his consummate mastery of the material. Thus he worked on in this exquisite jewelry of art, his sight holding out in a most wonderful manner, and enabling him to accomplish the most minute work till nearly eighty years of age, then a few years of inevitable decay, his labours not forgotten by the Crown, and his good, talented, peaceful, and laborious life closed in the arms of his children, at Brighton, December 29th, 1869.

His eldest son, of the same name, a young artist full of promise, died some years since.

CONTINENTAL SCHOOLS OF ARCHITECTURE.

THE artistic education of England is allowed on all hands to be insufficient. Many Englishmen have been abroad to investigate the methods of art-training now followed on the Continent. Very few Englishmen have undergone complete training in German and French art-schools; so that the evidence concerning these schools is that of English outsiders, who are as ignorant of the most important facts as the public they purpose to enlighten. The evidence we offer is that of an Englishman, a graduate of the Polytechnicum of Zurich, and a medallist of the École des Beaux Arts, Paris.

We shall here sketch the life of a student of *architecture* in Zurich and Paris.

In Zurich the Polytechnicum course lasts three years. The student qualifies himself for matriculation in the following subjects :—I. Algebra; II. Geometry; III. Descriptive and Analytical Geometry; IV. Natural Philosophy; V. Chemistry.

In the *first* year he attends lectures on :—I. Differential and Integral Calculus; II. Technical Chemistry; III. Construction; IV. Descriptive Geometry; V. History of Art.

The rest of his time is devoted to—1. Drawing pieces of architecture; first from Greek monuments, and then from Italian Renaissance. Le Tarouilly's plates are much used for the purpose. 2. Drawing the nude figure from the cast, four hours a week. 3. Ornament, six hours a week.

In the *second* year the student attends lectures on,—I. Statical Pressures; II. Construction of Roads and Bridges.

He fills up his time with—1. Composing Architectural designs; 2. Landscape Painting; 3. Modelling; 4. Drawing ornaments from the cast.

The *third* year consists of,—I. Semper's third course on Practical Æsthetics; II. Architectural Designing.

There are monthly and yearly examinations. Thus the student is ever kept alive to his work. If successful in all these examinations, the candidate is entitled to the degree of architect.

In the opinion of many competent judges, the mental discipline of the Polytechnicum is too rigid, and tends to cramp the originality of pupils. Again, the Polytechnicum teaches a great deal more high mathematics than necessary for practical purposes.

Now for the École des Beaux Arts.

The pupil in the École des Beaux Arts is left entirely to his own initiative, and that of private institutions named *ateliers*, where he is taught by his elder comrades, and by a professor, who is generally a "Grand Prix de Rome."

Not unlike the University of London, the École des Beaux Arts is mainly an examining prize-conferring Board. It also appoints a staff of salaried professors, who lecture publicly and gratuitously on all architectural subjects.

The candidate for matriculation in the École des Beaux Arts must submit to a competitive examination open twice a year.

The matriculation subjects are :—I. Drawing from the cast an antique monument, as a tripod or caryatides. Time allowed, eighteen hours. II. Composing a small architectural design, such as the middle pavilion of a town-hall, or a small law-court (*Tribunal de première instance*). Time allowed, one day.

If approved in the above, the candidate goes on with examinations in :—III. Mathematics; IV. General history of art.

The successful candidate is then named *Élève de 2de Classe de l'École des Beaux Arts*, and works up for his title of *Élève de 1re Classe*, which he secures by obtaining,—I. Three honourable mentions in architecture; II. One honourable mention in mathematics; III. One in construction; IV. One in descriptive geometry; V. One in stereotomy; VI. One in perspective; VII. One in drawing from the cast.

The *élève de 1re classe* may then compete for the largest designs, such as public buildings and noblemen's mansions. For these competitions the school offers medals as well as honourable mentions. When the *élève de 1re classe* has obtained twelve honourable mentions, he can compete for the diploma of the École des Beaux Arts, which brings his studies to a close in that school.

No candidate has yet taken less than two years passing from the second class to the first. Few have been less than three years securing the twelve honourable mentions which qualify them for the diploma competition. So, reckoning one year's preparatory studies, a young Frenchman is seven years completing his architectural studies.

The studentship of the "Grand Prix de Rome" is a contest apart from the ordinary business of the school. Every Frenchman under twenty-five years of age is allowed to compete for it.

This competition is divided into *three* stages. In the *first* stage a small and easy design—say a funeral monument or a public fountain. Time allowed, twelve hours.

The sixty best candidates are chosen by the jury.

In the *second* stage, the sixty candidates compete for a large design. Last year the subject was a manufactory of carpets, such as the Gobelins. Time allowed, twenty-four hours.

The first ten candidates in the second trial are admitted for the *third and final* trial, which lasts three months. The candidates, shut up in separate rooms during four days, have to sketch the general outlines of their plans. Copies of these sketches are handed over to the commission of the school. In the three remaining months the candidates have to work out those sketches, without introducing any material changes, and the drawings are to be finished by the candidate himself in closed quarters.

This system of isolation used in all the competitions of the school stimulates and insures the originality of the candidate.

The training given by the École des Beaux Arts, Paris, is, in our opinion, superior to that of the Zurich Polytechnicum.

One thing, however, is wanting in Paris, and that is, a searching course of lectures on the History of Art, accompanied by competitive examinations in that subject.

"*Ars longa, vita brevis,*" is a maxim well understood on the Continent. The English conviction strikes us as: *vita brevis: ergo, ars brevior.* To mistake art for a knack which may be picked up in a year or two, is to mistake mind for body.

No wonder that English architectural art is as exuberant as an unweeded garden. Brimful of ideas and conception, the English architect has never learnt how to marshal them; in other words, he creates, but does not *compose*, using the word in its high sense of harmoniously setting together things that will harmonise. The Continental student learns to tread his way through history, and to give a reason for his every step.

A great architect ought to be a sound historian and æsthetist, as well as a fair mathematician. It is hopeless to expect substantial grounding in these departments of human knowledge without long and systematic schooling. Whether parents in England can keep their children *in statu pupillari* as long as on the Continent is a question for political economists, not for artists. The arts are wayward muses, and only yield acquiescence after assiduous wooing. We hail with joy the English art movement, and firmly believe that, with Continental advantages, English students would quickly come to the front and stand unrivalled, thanks to their indomitable energy and sinew.

LAWRENCE HARVEY,
Graduate of the Zurich Polytechnicum, and Medallist of the École des Beaux Arts, Paris.

THE "CORPS DES PONTS ET CHAUSÉES."

MR. C. VIGNOLES, F.R.S., in the course of his weighty and important address as President of the Institution of Civil Engineers, said,—It was Louis XI. who first established post-houses and relays of horses along certain chief roads. In 1550 the first road guide-book for France was published, describing about 100 routes. In 1556 a regular *chaussée* from Paris to Orleans was made; but for more than a century later the great highways (and for these only had any repairs been hitherto undertaken) were only suited for the rapid transit of horsemen, though wagons or other covered or uncovered vehicles, like the *araba* of Eastern countries, or the *tarantass* of Russia, travelled in good weather over the wild tracks. It was in 1660 that the celebrated statesman Colbert was appointed by Louis XIV. Comptroller-General of Finance, and for many years he exercised powerful and efficient rule over all the ways of communication, employing independent architects and engineers, civil and military (most of whom he appears to have mistrusted, and paid all badly and irregularly). Much of their time and large sums were devoted to keeping passable the chief routes from Paris to the seats of war, for the passage of the Grand Monarque to enjoy the triumphs gained for him by his armies.

At the death of Louis XIV., after several abortive attempts, the charge of the internal communications was taken out of the hands of the Fiscal Department, and the decree of the 1st of February, 1716, marked the date of the actual establishment and definite organisation of the *Corps des Ponts et Chaussées*; a hierarchy of engineers was then created, which, though the duties first attributed to them have since been vastly extended, still exists in its leading features.

As now constituted, this *Corps des Ponts et Chaussées* forms the most important branch of the Government Department in France, designated as the "Ministry of Agriculture, Commerce, and Public Works." It is impossible, in a brief sketch, such as I am attempting, to give more than a faint idea of the importance and many ramifications of this ministry, which includes the direction, inspection, and in many cases the carrying out of what, in this country, are assigned to various and generally independent bodies, or are not looked after at all, at least systematically.

The engineering branch inspects and controls every railway, canal, and navigable river, whether completed and in operation or only in progress. It brings every mill and manufacturing establishment, worked either by water or by steam, under its direction; mines, sunk or open, beds of minerals, quarries and collieries, come under its regulations, and, of course, all steam engines, stationary or locomotive. Also all establishments for electric telegraphs, water, or sewage, and the streets and improvement of towns. A special office is devoted to the management of all the lighthouses, channels, and buoys on the coasts, estuaries, and harbours. The construction and repair of highways and carriageable roads of every class come under its control. Further, it establishes the minute regulations for the preparations, on fixed scales, of every plan and section intended for the purpose of soliciting a concession, and for every stage of the works subsequently executed.

Thus this ministry combines in itself, and becomes, theoretically, responsible for many of the duties performed in this country by the "Standing order" and other committees of both Houses of Parliament, by some department or other of the Board of Trade, the Custom House, the Ordnance Survey Office, the hydrographical branch of the Admiralty, the Trinity Board, the Woods and Forests, the Board of Health, and other public boards and commissioners, by the county, city, and borough surveyors, by the waywardens, and by innumerable local officers throughout the United Kingdom; besides many other duties and functions which in this country we have had no thought of creating for the purpose of control, but which are vested in this ministry by their perfect system of centralisation.

To keep this enormous machine in good working order the subdivision of labour and responsibility has been carried to an extent which is a striking proof of the organising faculties of the French. There are in Paris about thirty-two bureaux, each with its staff of chief, deputy, and clerks, of which fully one-half have their attention devoted exclusively to public works. So of

the almost as many permanent commissions sitting in Paris.

For the public works, the corps has 877 engineers in eight classes, of which 134 belong to the division of mines, and 4,343 conductors, in five classes, of which 149 are mining guards. In addition, there are 275 harbour-masters and other port officers. In the whole, 5,495 *employés*, at the present time nominally available, and 150 officers are invalided with retiring allowances, there being nearly 200 widows of deceased officers in receipt of pensions. The *École des Ponts et Chaussées* has fifteen professors, mostly from the corps, eight teachers, and thirty other persons on the staff for regulation purposes; at present, however, there are only fifty-five pupils at the school. The *École des Mines* has sixteen professors (mostly engineers), eight teachers, and a large staff besides. There are only nine pupils. The two working mining schools at St. Etienne and at St. Alais have thirteen professors and teachers. We have often heard of the admirable modern management of the streets of Paris. To effect this there are specially appointed sixteen engineers of all classes, and 152 conductors, who have charge of the public streets, roads, foot pavements, promenades, plantations, water supplies, and sewerage, all appointed by the minister, but paid for by the municipality of Paris. I am not now considering the cost, but merely the organisation, which is certainly most complete and effective in its results.

The late Mr. Hosking, Professor of Engineering and Architecture at King's College, laid it down as a maxim that it is "the combination of the workman and the man of science that forms the civil engineer;" and I adopt the definition, as we all must. But the engineer of the *Corps des Ponts et Chaussées* is a highly educated scientific gentleman, and as our esteemed member, Mr. Calcott Reilly, said in a debate a few weeks since,—and there can be no better judge,—"These engineers are all mathematicians." No doubt; but very few probably are at first practical men. These are found in the class of *Conducteurs des Travaux et Gardes-Mines*, and the young engineers are usually wise enough, till they acquire their own experience, to rely on them, they being generally really workmen.

These conductors of the *Corps des Ponts et Chaussées* are a most valuable, and, in the main, trustworthy body. They are entered, first, into the lowest of the six classes into which they are divided at the average age of about twenty-five, after having served an apprenticeship to some master workman. By the time they are fifty they get to rank as principal conductors, and after a further service in that rank, varying from three to thirteen years, they obtain appointments as sub-engineers, but rise no further from want of sufficient previous education; they may be considered as the corporals, sergeants, and sergeants-major of the corps.

Those of higher grade (the commissioned officers, as it were, of the corps) enter the *École des Ponts et Chaussées* at about twenty-one, and at the end of three, four, or five years, are usually qualified for, and pass their examination, being then appointed as ordinary engineers of the third class, at which period they are not far from five-and-twenty. They then rise through all the ranks of the hierarchy, until they attain the position of inspector-general of the first class (the highest grade), after a service of thirty-six years, on the average. I have not been able to ascertain the rules of promotion, but I infer that the promotion is not altogether by seniority. Neither can I get any reliable information about their pay, except that the first forty engineers-in-chief of the first-class, each having served about thirty-five years in the corps, on the average, appear to be entitled (under what circumstances I know not) to a salary of 320*l*. a year.

Such are the arrangements in the celebrated *Corps des Ponts et Chaussées* of France. In theory the system is perfect, but it drags along terribly slowly according to our ideas—and we must come to the conclusion that, however powerful to control, it is ill adapted to originate.

This complete organisation is kept up by the strictest supervision. Among other regulations is the preparation annually of a volume or directory of 500 closely-printed pages, chiefly tabular—bulky as the annual list of our army. It is interesting to turn over the leaves, and I shall place in the library a copy of the last publication for 1869, by way of voucher for the analysis I have given you, but there is no record of works executed, except occasional and voluntary contributions from engineers to a separate official publication, by the department, entitled the *Annals of the Corps*, commenced about forty years ago, and still regularly continued. These *Annals* contain papers of the same character as those which appear in our own printed minutes; but they set forth, in addition, every decree and ministerial decision upon points of engineering practice, especially in the working of the conditions in concessions granted. These can only be compared to a collection of reported law cases on these subjects, which in fact they really chiefly are.

The system of interference and control in all matters of engineering has been adopted more or less stringently by every Government in Europe. It has been introduced into most of the States in South America. I have had to encounter it in France, Spain, Switzerland, Holland, North and South Germany, Russia, Austria, and Italy, and in its most annoying and most mischievous form in Brésil.

MESSRS. POWELL'S GLASS WORKS.

A visit to the old glass-house in Whitefriars serves to show the advantage of personal superintendence and the kindly feeling existing between the principals and the art-workmen, and illustrates very satisfactorily the progress of the art of glass-blowing in this country. It is seen that by the introduction of patterns of the ancient Italian work, or fresh designs of the same character, the art-workman can obtain remunerative wages, without necessitating great charges for the objects made; for the vase and tazza, delicate and elegant though they be, do not need any additionally skilled hand: the materials from which they may be made are of the simplest kind, and the cost therefore is in great part the glassblowers' wages. In the specimens of the purest glass, the materials of which are necessarily the most costly, additional expense is often incurred by the employment of a skilled engraver; but where the patterns are simple though elegant, the cost is still very moderate. The specimens in opal glass are particularly satisfactory.

In another department of these works it is difficult to recognise the same material when it is seen in the form of wall tiles and pavements of peculiarly quiet tones of colour and unglazed surface. These tiles, when cut into leaves or scrolls, form elaborate pavements of most agreeable tone, and with the same opaque glass, cut in shapes in the same way that transparent glass is cut for lead lights, pictures are formed, which may be finished in outline, or elaborately shaded.

In the same show-room there is the cartoon painted by Mr. Moody, of South Kensington, for the east window in Bishopsgate Church, lately executed at these works, and it is an open question how far the depth and beauty of the English colours surpass in effect the more delicate finish of the Munich work at St. Paul's, the cost and expenses of the English work being at the same time much lower.

The Messrs. Powell were the first to produce an improved material for the use of glass-painters, and they seem determined not to rest under their early laurels.

ROYAL HORTICULTURAL SOCIETY: WORKS AT SOUTH KENSINGTON.

We understand that the 1851 Commissioners (in connexion with the proposed annual international exhibitions to be held by the Commission) have arranged for the completion of the gardens and arcades, without entailing any liability on the Horticultural Society. They will also construct conservatories on the upper arcades, by which the first floor of their permanent exhibition buildings, to be erected on the annexes adjoining the central arcades, will be put into direct communication with the society's conservatory.

These works will be completed before the 1st of May, 1871, the date fixed for the first of the series of international exhibitions.

The exhibitions will consist solely of objects which have some special interest or recommendation; and while pictures and other attractive works of art will form part of each exhibition, selected manufactured objects, of a few classes only, will be admitted in any one of the series, so as to extend this branch of the exhibition over a sufficient number of years to allow time for improvement, before the same class of objects is again brought forward.

By means of the Royal Albert Hall the Horticultural Society hope to obtain an additional access to the garden, and better accommodation for their shows, meetings, library, and reading-room. The prosperity of the society will, in fact, be materially influenced by the success which may attend this and the other undertakings which her Majesty's Commissioners have entered upon on their estate. The building is proceeding with rapidity, and will be finished, it is thought, and ready for opening by the same time as the new exhibition buildings on the annexes. There are still sittings in the hall that may be subscribed for.

THE DISTRICT SURVEYORS' ASSOCIATION.

At a general meeting of the District Surveyors' Association, held at the house in Conduit-street, on Friday in last week, a testimonial was presented to Mr. Chas. Fowler, the honorary secretary of the Association, an office which has been held at different times by Mr. George Pownall, Mr. Henry Baker, Mr. Robert Hesketh, and other esteemed members of the profession. The present took the shape of a handsome silver salver appropriately ornamented, the result of a guinea subscription from some fifty of the district surveyors, and is thus inscribed:—

To
CHARLES FOWLER, Esq., M.I.B.A.
From his colleagues,
Members of the District Surveyors' Association,
In recognition of his very efficient services,
For 9 years, as their
Honorary Secretary,
And as a mark of their cordial regard.
1870.

Professor Donaldson, who was in the chair, with that warmth of feeling which makes him always ready to take prominent part in a kindly act, descanted on the good services that Mr. Fowler had done, and their often-times onerous character, and presented the salver to him in the name of all his associates, and with their hearty applause. Mr. Joseph H. Good, the excellent treasurer of the Association; Mr. Godwin; Mr. Geo. Gutch, probably the oldest member of the body; and Mr. Charles Mayhew, who, though now retired from the profession, claimed his right as honorary member to contribute,—all bore hearty testimony to the ability and courtesy with which the duties of the office had been discharged. Mr. Fowler, who was altogether ignorant of what had been done, expressed feelingly his surprise as well as his gratitude and pleasure; and the meeting again quietly settled down to its ordinary business,—mutual advice and the discussion of moot points. Few know the large amount of time which many of the district surveyors holding office under the Metropolitan Board of Works give, beyond the work of their several districts, with a view to the rightful and uniform discharge of the very responsible duties of the office.

THE PRESTON AND MANCHESTER INFIRMARY.

The new Preston and County of Lancaster Infirmary, built from the designs of Mr. Hibbert, architect, is now open to a certain extent (dependent on funds available) for the reception of patients.

The western pavilion forms one-half of the complete plan. The erection of the eastern one is left to the future. Until that is accomplished, the classification of sexes and of cases will be comparatively imperfect. The males will occupy the ground floor, and the females the upper floor of the pavilion. The building, formerly known as the House of Recovery, has been enlarged, and re-arranged to form the administrative department, as well as the dispensary and out-patients' department of the institution. That building and the former limits of the site, north and south, determined the disposition of the new pavilion. First, a corridor, 12 ft. wide and 45 ft. long, with windows on both sides, extends westward from the corridor of the old structure, and affords due separation from and access to the pavilion. Sliding valves, for cross ventilation, are over each window, worked by a simple arrangement below. The warming here is by cased coils of hot-water piping. The corridors will form a lounge for convalescent patients. At the end of the corridor is the pavilion, extending from the former at right angles to what were the limits of the site, north and south, when opera-

tions were commenced. It is a lofty building, of two stories in height above ground, and the arrangements on each floor are identical. We will begin by describing the large south wards, one above the other. These are each 110 ft. long, 26 ft. wide, and a little over 16 ft. in height, arranged for twenty-four beds, two beds between each window. When fires are not required four beds additional can be placed. Taking the maximum number at twenty-eight beds, there are upwards of 100 square feet of floor area to each patient, and 1,700 cubic feet of air space. The large windows on each side are glazed with plate-glass in order to economise warmth, and open as sashes in three divisions, the lower sashes in the ordinary manner, the upper sashes being worked up and down by a hook at the end of a rod. Valves, sliding hit and miss, 3 ft. long, are over each window, worked easily from below. There are also small sliding valves below each window on opposite sides, to cleanse the lower stratum of air when needful. At the ceiling level are Sheringham's movable ventilators, acting in conjunction with foul-air shafts opposite, delivering out above the roofs.

The warming is by two large stoves with open grates, of a construction that has been specially devised. They project from the side walls, and form a large hollow mass, built of brickwork, and entirely within the room. Fresh air is admitted from the outside, is warmed by contact with the firebrick back and sides of the open grates, and delivered through gratings at the top of the stoves into the wards. The rude firebrick construction is cased round with coloured glazed tiles, and covered over with a moulded stone. Fresh air is admitted within the stone fenders to supply the fire and increase the draught. Provision is made by descending shafts for sweeping the smoke-flues in the basement below. The arrangements for lighting are by gas pendants, enclosed in ventilating tubes, terminating in large ground-glass globes, that serve to soften the light. The products of combustion are carried off from the tubes by shafts delivering out above the roofs. At the south end on each floor are glass doors, leading to a loggia below and balcony above, where patients may be wheeled out in their beds, if necessary, for the benefit of the sun and air. Adjacent are the entrances to the bath-rooms, lavatories, sinks, water-closets and other conveniences, screened off from the wards, and separated therefrom by passages, with windows and ventilators on opposite sides, and doors, so as to prevent interchange of air between these places and the wards. On one side of the wards are the bath-rooms, with shower-baths, lavatories, and portable baths on wheels, to bring to the patients' bedside, with provision for filling and emptying, and supplied with hot and cold water. On the other side are the water-closets and slop-sinks, for emptying and getting rid of fœcal matter from the bed-pans, and other liquid waste; also a urinal in the men's department. Dust-shafts are also provided herein, for the floor-sweepings. These places are warmed with hot-water pipes, and have the same arrangements for ventilation and gas lighting as the wards. All the waste and soil pipes, together with the gas pendants, are ventilated by shafts and trunks connected therewith, and deliver out of the high mansard roofs above. At the entrance of the large wards are the nurses' rooms and the ward sculleries, with small glazed openings between them and the wards, to allow of inspection of the latter at all times. In the ward sculleries are small ranges with oven, hot hearth, and plate-shelf, for keeping the diets warm; also hot closet for airing the ward linen, sinks with hot and cold water laid on, plate-racks over and cupboards for crockery, &c. Near at hand are separate shafts for the descent of foul linen and ashes to the basement, ventilated and delivered out above the roof; also a hoist from the basement to the several floors above for coals and food. Here also are the bell and speaking tube arrangements, by means of which the nurses on each floor can communicate by signal and word of mouth with the porter and kitchen servants, comparatively remote in the administrative department.

Northwards of the staircase are wards for special cases, two on each floor; and beyond those a ward of eight beds on each floor, 37 ft. by 26 ft., by 16 ft. 6 in. high, all with the same provisions for warming, ventilating, and gas lighting as have been already described, and having the same arrangements of baths, portable baths, lavatories, water-closets, slop-sinks, with intercepting passages, as have been described in conjunction with the large wards, but on a smaller scale. The wards for special cases contain 2,300 cubic feet of air space to each patient, and 150 square feet of floor space. The north wards, of eight beds each, contain 1,900 cubic feet of air space to each patient, and 120 square feet of floor space. Altogether the maximum accommodation in the pavilion is for seventy-six beds.

In the roof space above the top floor are the cisterns for the hot and cold water supply, and the ramifications of service piping. Here also all the foul-air shafts from the wards, gas-pendants, waste and soil pipes, converge in air-tight trunks before delivering into the outer air above the roof. Trays of charcoal for purifying the foul air before exit are placed in these trunks, in situations easily accessible for replacing. All the water-pipes are lapped with felt, and gas is laid on to all the spaces in the basement and above the roof where they traverse, so that with proper care on the part of the administration, no bursting of pipes from frost ought to ensue.

The contract for the erection of the building, independent of furniture, was 9,280*l*. Extra cellaring under the pavilion, additional buildings in the rear of the old structure for the better accommodation of out-patients and accident cases, a ward after operation, together with considerable extension of the original plan of the washhouse department, owing to the introduction of steam-machinery, not originally contemplated, and the unforeseen extent of repairs required by the old building, bring up the building account to 11,700*l*. The engineering departments, fittings, and furniture, the laying out of the grounds, the purchase of the land on the north side from the overseers, and the enclosure of the site, payment of architect and clerk of works, together with the maintenance of the institution up to the present time, bring up the total expenditure to something between 17,000*l*. and 18,000*l*.

THE CONSECRATION OF CROYDON NEW CHURCH.

THE consecration of Croydon parish church, which has taken place, is regarded as a great event, and rightly so.

We gave an account of the new structure on the 16th of October, in our Church Building News; but we may here subjoin a few additional particulars.

The stained-glass windows are at present five in number, and comprise some specimens of both English and Foreign workmanship, those of the former being decidedly preferable. That in the east, over the communion, is a rich piece of colouring: in the twelve apertures between the stone-work are scenes from the life of our Saviour. This was purchased by special subscription, the principal part of which was collected by Miss Hodgson and the ladies of the congregation. The west window, under the tower, was presented by Mr. R. A. Heath, and is of foreign workmanship. The window in the south chapel is the gift of Mr. C. S. Robinson, Duppas-hill. In the south side of the chancel, over the vestry door, is a memorial window, given by Mr. W. J. Blake, of Duppas-hill. The fifth window, which is in the south side of the church, near the once beautiful monument of Archbishop Sheldon, has also been erected by private liberality.

Most of the historical monuments are for ever destroyed, and suggestions for their restoration have been made. Those monuments which remain in their mutilated state are, perhaps, best kept as they are, as relics, not only of the primates whose effigies they bear, but also of the great calamity which disfigured their artistic beauty. At present they are protected from injury by iron railings, and strangers would lose one chief item of interest in the church and its associations if all traces of the fire were obliterated.

The new organ is one of Messrs. Hill & Son's. It is placed in and completely fills the north-eastern recess at the side of the chancel, and is worked, as the former one before the fire, by hydraulic power in the basement.

The clock is placed on the second floor of the tower, one story above the dials. It is fixed upon stout oak framing, and enclosed in a large glass case to protect the delicate works from the dust. Messrs. Gillett & Bland, in order to produce as perfect work of its kind as possible, have introduced all their latest improvements. The clock strikes the hours upon the large tenor bell, of 31½ cwt., with a hammer-head weighing 90 lb., and chimes the quarters on the 2nd, 3rd, 4th, and 7th bells, the same as at the Westminster Palace clock. The time is shown upon three dials, each 8 ft. in diameter, which are fixed in the north, west, and south sides of the tower (the walls of which are 6 ft. thick). The figures and minutes are of cast iron, raised and gilded, as is also the ornamental rim round the edge of each dial; and the background is of copper, painted black. The three pairs of hands are of stout copper, with brass backs, to give them extra strength, and, of course, are gilded to correspond with the figures. The hands altogether weigh 140 lb. The machinery for working the hands is below the clock, the centre of the dials being in the ringers' room on the first floor; the hands are driven from the clock by a perpendicular rod, at the top of which is a bevilled wheel, running in gear with another on the clock, and at the bottom of this is another bevil wheel which turns three others, all fixed in the same frame, each having a connecting rod, 9 ft. long., which drives the motion-wheels at the back of each dial, and thus moves all the hands simultaneously. Messrs. Gillett & Bland have improved upon their original patent chiming-machine, in the Boston chimes.

Mr. Scott's design, we may say in conclusion, is very similar to that of the old, and is in the Early Perpendicular style. The edifice is now lengthened to 123 ft. by 80 ft. wide. The lengthening is in the chancel, which, by the way, is now the property of the churchwardens, having been purchased by them (for the parish) from those who had a prescriptive title to it in the old building. The sum put down for this right is 1,000*l*.

The works have necessarily been of an extensive character. The contract of Messrs. Dove Brothers, the builders, is upwards of 25,500*l*.; Mr. Scott's commission as architect, 1,200*l*.; and the total cost is near upon 35,000*l*. The liberality of several of the parishioners, who have supplied various embellishments and appointments, has, however, lightened the cost to the Restoration Committee to a considerable extent.

A work, titled "Croydon Church, Past and Present," by Mr. J. C. Anderson, is being got up in imperial quarto, with illustrations on steel, wood, and photolithography. The price named by Messrs. Sotheran & Co., of the Strand, is 3*l*. 13s. 6d. The work is printed for subscribers only.

FEVER AND PESTILENCE.

Scarlatina in Dundee.—A meeting of the Dundee Police Commission in committee has been held, for the purpose of considering what steps should be devised for checking the spread of scarlatina in the town. Provost Yeaman presided; and there were also present other members of the town council, and Drs. Pirie and Alexander, medical officers of health. Drs. Christie and Maclaggan also attended. The clerk read a letter as to the sanitary measures adopted in Bristol; and the superintendent of police, Mr. D. Mackay, reported the results of an inspection of lodging-houses, &c. A long communication was also sent from the town surveyor's office by Mr. William Mackison, the sanitary inspector, on the state of the town, with suggestions. Dr. Maclaggan, Dr. Christie, and Dr. Pirie addressed the meeting; and a draft circular and queries to be sent to teachers was read and considered, and amendments suggested upon it. The whole subject having been discussed, the meeting resolved that Dr. Pirie be requested, with the assistance of the other medical gentlemen present, to prepare in the form of a handbill, for circulation among the inhabitants, a memorandum of the measures suggested to be observed by the community to ensure cleanliness and prevent scarlatina. The meeting instructed the sanitary committee to continue their exertions for the purpose of enforcing cleanliness, and securing as far as possible the health of the inhabitants. The medical gentlemen present concurred in stating that the disease was now not only milder in type, but that the number of cases was on the decrease. The sanitary committee, on the 7th inst., having considered the remit to them by the Board, and having heard the medical officer and inspectors, resolved that the following measures be adopted with the view of improving the sanitary condition of the burgh:—The surveyor was instructed to make an inspection of closes and courts within the burgh, and report as to such of

them as require to be paved with flags, or otherwise improved, commencing with the more dense parts of the town. The inspector of cleansing was instructed to flush with water the closes and courts in the most thickly populated parts of the town, and to spread disinfectants upon them, and Inspector Kinnear was instructed to cause such of these closes and courts as require it to be whitewashed. It was considered advisable that a circular be addressed to the schoolmasters in town, recommending them to prevent the attendance at school of children in whose families fever is known to be.

Pestilence in Calcutta.—The *Times'* correspondent, writing from Calcutta on the 14th December, says:—

"While Calcutta is preparing for rejoicings, the pestilence of malarious fever is slowly creeping up to its native quarter. At present the fever is wasting the municipal towns of Burdwan with its 40,000, and Serampore with its 20,000 inhabitants. The very constables are so prostrated that they cannot make the usual mortuary returns. In some villages the whole population has been carried off, or has fled till the landholders cry out to Government to help them, since their rents are gone. Yet the fever is curable, and is not infectious; but the poor people lie on the damp soil, lightly clad, badly fed, and unable to cook or go for the filthy water at their door, or help themselves. Caste prevents them from helping each other. But a special English doctor is wanted to superintend the native apothecaries; and drainage—above all things, drainage. After stating that in some villages near the marshes 60 per cent. of the people have died, and in others 50, Mr. Adley submits estimates showing that the worst parts can be immediately drained, at a cost of only 31,000*l.*, so as to yield new rental of 15,000*l.* a year; and that if the whole country were drained land would be reclaimed to the value of 102,000*l.* a year. But legislation is necessary to override the rights of private property, for the landlords will not combine."

PUBLIC ROOMS, SHEERNESS.

PUBLIC rooms, and a concert-hall, 100 ft. by 50 ft., have been built in Sheerness, by a limited company, and will be opened, with a dinner, on Wednesday, the 26th. The style of the building is the pseudo-Italian Gothic of the day. Messrs. Jeffrey & Skiller, of Hastings, were the architects, and the cost is stated at about 4,500*l.* Sheerness now possesses a railway terminus, is two hours' journey from the metropolis, and available from all the large Kentish towns and cities. The pier is used at any height of the tide by steam-packets plying daily up and down the Thames and Medway. The population is not less than 18,000.

We agree with those who think it somewhat strange that while English capitalists are actively engaged in developing the attractions and conveniences of various foreign watering places, only available by English visitors of large means, their attention should not have been turned, before now, to a position lying so close to the metropolis, immediately on the water highway of the world's traffic, and thus to be reached by thousands whose moderate means preclude indulgence in long and expensive journeys in search of pleasure or health.

NEW ASSIZE COURTS, DURHAM.

THE Durham Assize Courts have undergone complete revision under the direction of Mr. W. Crozier, the county architect, and may be considered new. They appear to have elicited the warm commendation of those who have had to use them. We give a view of the Crown Court, a view in the Central Hall, and plans of the various stories, specifying the offices and rooms.

Entering the building by one of the three large entrance-doors from a raised terrace on the main front, a vestibule is found, 40 ft. by 11 ft., running right and left. Out of this vestibule access is obtained to gentlemen's waiting-rooms, and the chief constable's and county surveyor's offices. Passing on through three glazed double doors, a corridor is entered, 40 ft. by 6½ ft. wide, running parallel with the vestibule. At the end of this corridor access is gained to the ladies' waiting-room. After passing across this corridor the central hall is found, one of the main features of the new arrangements. The hall is in the centre of a square formed by the two courts, the grand jury-room and the magistrates' meeting-room. On the south side is the main staircase, leading on the first landing to the grand jury-room, waiting-room for grand jury witnesses, and indictment office. Turning to the right and left you ascend to a balcony extending round the four sides of the hall, and from this access is obtained to the magistrates' meeting-room (formerly the grand jury-room). The hall is 52 ft. by 29 ft., and 30 ft. in height, lighted from the ceiling by three large ceiling-lights, in a deeply-sunk, beam-panelled, level ceiling. The floor is laid in panels in granite cement, intersected by borders of Maw & Co.'s encaustic tiles. The main stairs and the hall balcony are both fitted with bronzed hand-rails, the newels having terminals formed of the sceptre, and the letters V.R., and the crown in relief are on bosses on their sides, the ornaments being relieved in gold. The effect of the polished stone columns, in two heights, surmounted with arches over the main stairs, and the columns on the north side of the hall is agreeable. The new grand jury-room, grand jury witness's room, and indictment office, are well lighted; and over these, approached by a side staircase, are four spare rooms, which may be used for references, grand jury retiring-room, solicitors' room, or other purposes. Retracing our steps to the foot of the main staircase, and passing under the first landing, we enter a room to be used as a barristers' robing-room, with lavatories, wardrobes, &c. The judges' retiring-rooms (fitted with necessary convenience) are to the right and left of the barristers' robing-room. The judges can either enter at the rear of the building, out of the gaol yard, or by the main front entrance.

The courts are entered by three entrances from the central hall;—one for the general public; one for prosecutors, suitors, and witnesses; and the third for professional men. These latter, before entering into the courts, pass through an intermediate lobby adjoining each court. The courts are much the same in appearance and similar in arrangement, except that in the Crown Court the dock is a permanent one, and in the Civil Court temporary; the space so temporarily occupied when used for the trial of prisoners, giving, by a simple arrangement, extra space and seats for the bar when used as a Civil Court. The courts are 50 ft. in length, 42 ft. wide, and 30 ft. in height, and are each lighted during the day by two large ceiling-lights, and after dark by large sunlight with eighty-one burners. The ceilings of the courts are panelled, coved from all sides of the room, and the walls are relieved by main pilasters with imposed pilasters between and arches resting on them, all supporting a cornice from which the coves of the ceiling spring. The architectural features in the vestibule, corridor, hall, and courts have been carried out in the Tuscan order, to correspond with the original design of the exterior of the building.

The fittings to the interior of the courts are in Dantzic oak and American ash, with red and yellow pine linings; the woodwork of the old courts having been used as the framing or heart to the new, the whole being stained and varnished. Across the entire south end of each court is the bench (including a lobby at each end, one for the judge as an access to his room, and the other for the jurors, changing from waiting jurors to the jury-box). The bench has a wooden-panelled canopy, ceiling, back, and sides; a pediment behind the judge supports the royal arms; the judges are near to each other, and have ready access for consultations when necessary. To the left of the judge, in the Crown Court, the higher box is for the grand jury, and the lower for reporters of the press. To the right of the judge are corresponding boxes for jurors, the higher box for those in waiting, and the lower one for the jury engaged on the trial. The jurors have a separate passage from these boxes to their retiring-rooms, which are neatly furnished and fitted with all necessary conveniences. In front of and below the judge are desks and seats for the officials. The witness is placed in the angle formed by the reporters' box and the bench, and facing the jury. In front of the court officials is a large table, having in it a moveable circular disc, so constructed as to be raised at pleasure to enable models to be shown and described. Round the table are the seats for solicitors. Behind the solicitors' seats are three tiers of sliding seats and desks, each slightly elevated one over the other for the use of the barristers. The second row of these tiers is divided by the interposition of the prisoners' dock, which is fitted with seats for the gaol officials. The dock has direct access from the male and female prisoners' waiting-rooms, which are built in the prison yard to the rear of the Crown Court. A curved passage, which gives its form to the seats, passes round the dock on the court level, giving access from side to side of the court. An entrance is provided on the court level for the governor of the gaol and surrendering prisoners, out on bail, to get into the dock; steps also ascend to the prosecutors' and witnesses' seats, which are behind the passage at the back of the dock. Immediately behind the witnesses' seats, and divided from the latter by an iron railing similar to the hall balcony railing, are tiers of seats for the accommodation of the public; these extend backward to the north wall, each tier rising 6 in. one over another. The floors of the courts are covered with kamptulicon, to prevent noise.

With reference to ventilation, fresh air is admitted to each court through an air grating under the raised steps in front of the north elevation, and passes along an air course (10 square feet in area) till it reaches the north side of the basement story (which extends under the whole floor of the central hall); it is here met by a water amotizer, which constantly gives out (extending over the whole sectional area of the air course) a mist or spray that washes and cools the air and regulates its hygrometric state, the waste water falling back into a cistern, and being used in the boilers; the air then passes to a fan, 6 ft. in diameter, which is driven by a small steam engine at a rapid rate, and is then forced either through the cold-air chamber or the hot-air chamber, or partly through one and partly through the other, according to the heat required in the courts, and which is regulated in the court as easily as hot and cold water—one or both—are admitted into a bath. The hot-air chamber is completely filled with hot-water pipes, heated from a low-pressure boiler. The air, after passing through one or both of the chambers, as may be necessary, then passes into a mixing chamber, and is distributed by brick, flag-covered, air conduits to all parts of the courts. The air is extracted by means of large air flues, constructed in the roof above the ceiling-level, and connected to a shaft 50 ft. in height at the corner of each court; the ventilation is assisted in the shaft by two coils of steam pipes, one at the public gallery, and the other at the ceiling-level; these coils are heated with steam from a steam boiler, the same boiler supplying power for the engine which drives the fans; the outer skin of the two boilers gives off the necessary heat for warming the central hall. The cost of the works will be about 5,000*l.* Mr. C. Turnbull has been clerk of the works, and has carried out the mason work, which was principally in alterations, with daily workmen; and the following tradesmen have been contractors for the different departments of the work:—Joiner and carpenter's work, G. Gradon, Durham; slater, R. Rule & Son, Durham; plastering, and cement, and tile flooring, W. B. Wilkinson, Newcastle-on-Tyne; painter and glazier, W. Hodgson, Durham; plumber and gas-fittings, James Laidler, Durham; heating and ventilation, Haden & Sons, Trowbridge and Manchester; furnishing, W. Robson, Durham.

Observations that have been made at different times since the courts were in use seem to show that the ventilation is well under control.

REFERENCES.

Basement Plan.

1. Fresh-air Conduits.
2. Sprays or Amotizers for washing and cleaning Air.
3. Fan-rooms, containing Fans.
4. Engine and Boiler Room containing Engine for driving Fans, hot Water and Steam Boiler.
5. Cold-air Chambers.
6. Coil Chambers, containing hot-water Pipes.
7. Air-mixing Chambers.
8. Channels for Fresh Air, cold or hot, to Conduits under Courts.

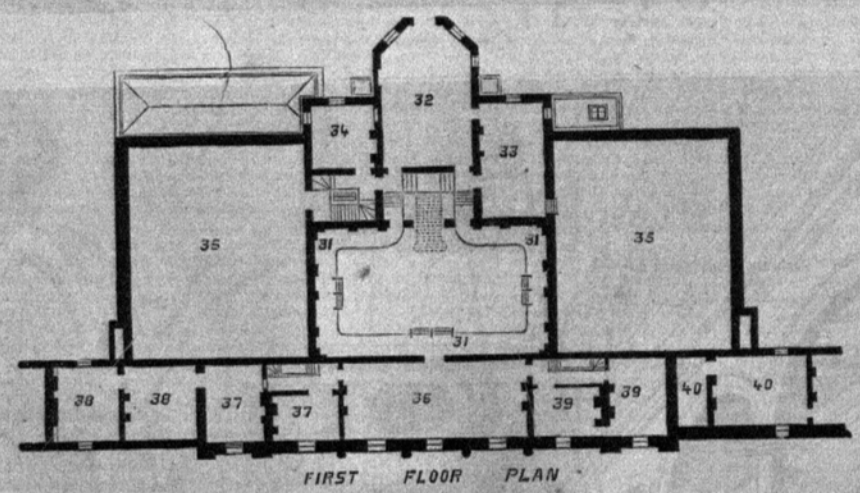
Ground Plan.

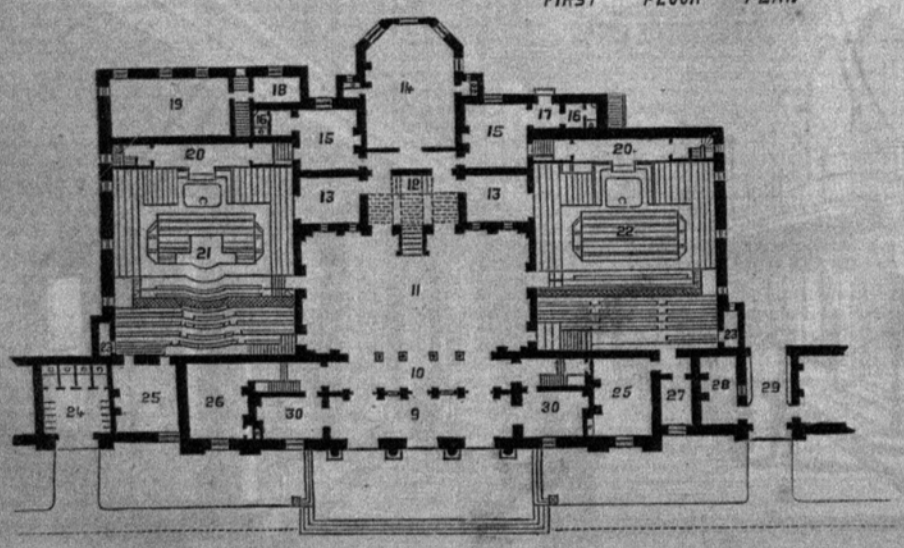
9. Vestibule.
10. Corridor.
11. Central Hall.
12. Main Stairs.
13. Barristers' Lobbies to each Court.
14. Ditto Robing-room.
15. Judges' Retiring-rooms.
16. Ditto Water-closets and Lavatories.
17. Porch for Judges' private Entrance from Gaol Yard.
18. Female Prisoners' Waiting-room.
19. Male ditto
20. Judges' Benches.
21. Crown-court.
22. Civil Court.
23. Extracting Shafts, with Steam Coils at Floor and Ceiling Levels.
24. Public Conveniences.
25. Juries' Retiring-room.
26. Ladies' Waiting-room.
27. Court Papers, Safe-room.
28. Gaol Porter's Office.
29. Entrance to Gaol.
30. Gentlemen's Waiting-rooms.

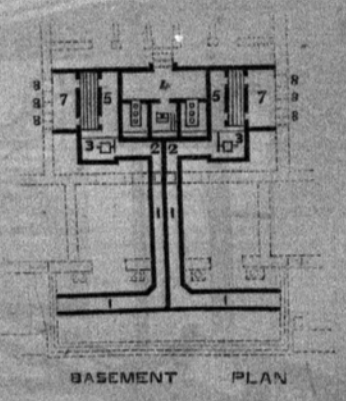
First Floor Plan.

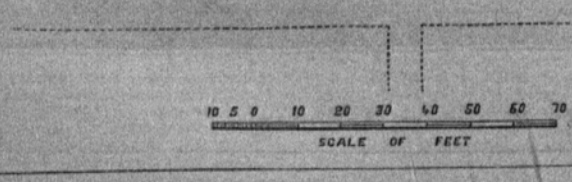
31. Balcony round Central Hall.
32. Grand Jury-room.
33. Grand Jury Witnesses' Room.
34. Indictment Office.
35. Upper Part of Courts.
36. Magistrates' Meeting-room.
37. County Police Offices.
38. Ditto Stores.
39. County Surveyor's Offices.
40. Gaol Porters' Bed-rooms.

MR. JOSEPH CUBITT, *Joint Engineer of Blackfriars Bridge.*

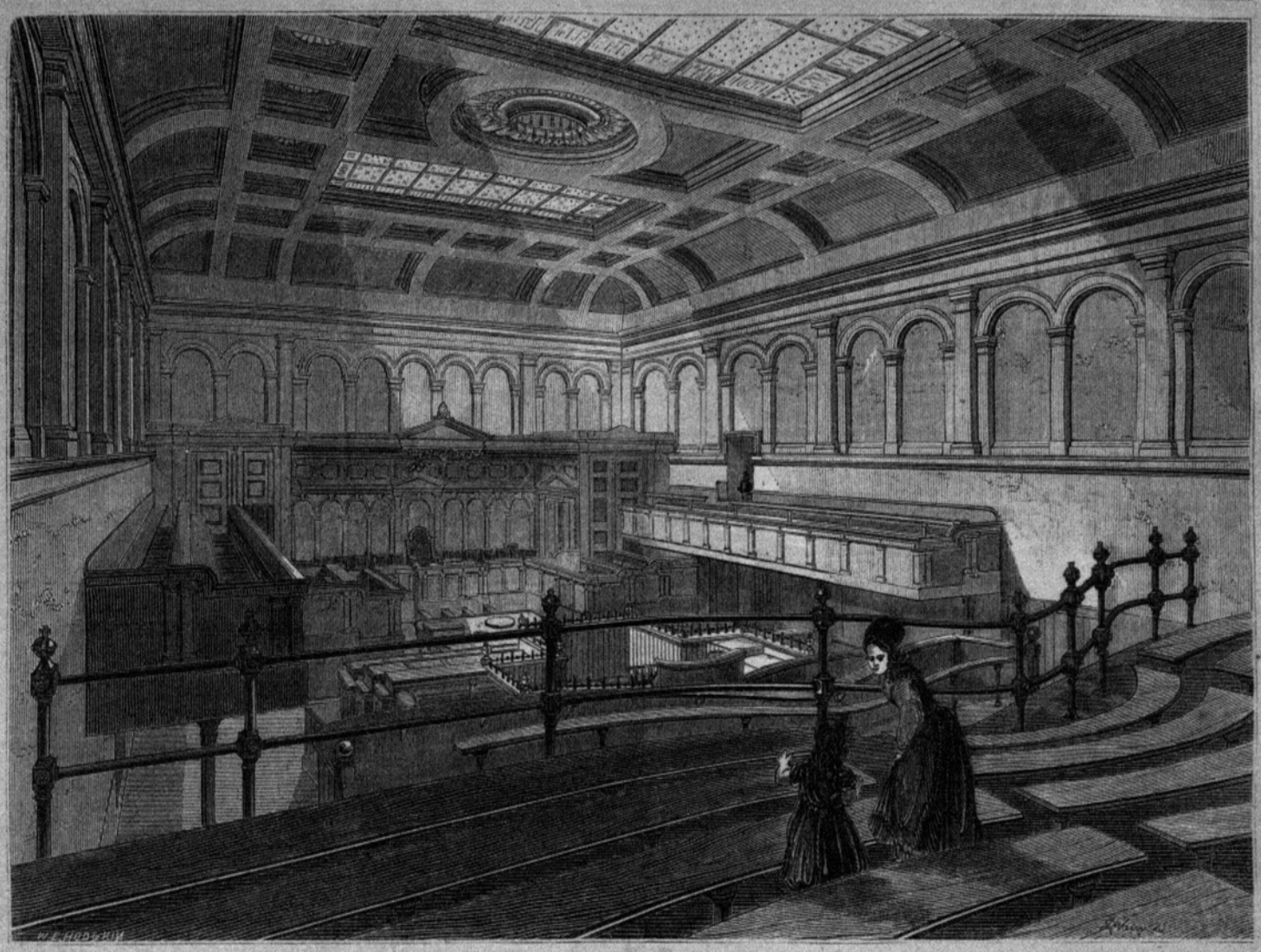








NEW ASSIZE COURTS, DURHAM.



Crown Court.

Central Hall.

NEW ASSIZE COURTS, DURHAM.——MR. W. CROZIER, ARCHITECT.

SCHOOLS OF SCIENCE AND ART.

Manchester Academy of Art. — The annual meeting of the members and council of this Academy has been held in the Royal Institution, Mosley-street, Mr. W. K. Keeling, the president, in the chair. The chairman, in opening the proceedings, said they would be glad to hear that the finances of the society were in a more healthy and prosperous state than at any other period since the formation of the academy; that additions had been made to the wardrobe and other properties; and that other costumes were in the course of being made, and that they hoped there would be no longer a necessity of hiring from their London costumier. Some time ago it was suggested that the form of the rules or constitution of the academy were on too extensive a scale, and required considerable curtailments and simplicity. Amended rules would be submitted, and, if approved, would be forwarded at once to Mr. Tidd Pratt for his approval. A subject of more than ordinary importance would probably be brought before the same meeting, viz., the desirableness of admitting ladies as students in the life class for the draped figure. Selim Rothwell (honorary secretary) read the council's report for the past year, which stated that in the life classes last session there were eighty-four nights of study, thirty-three of which were devoted to the nude, and the rest to semi-nude and costume or draped models. The academy at the present time consisted of twenty-three members, twelve associates, and nine students. The latter were steadily increasing in number. It was the intention of the council to hold another *conversazione* in the early part of the ensuing year. The limited space of the room for study did not allow of the academy forming a collection of books of reference, models, wardrobe, and furniture, as was absolutely necessary for the requirements of an academy of art. The report was adopted. Mr. W. K. Keeling was re-appointed president; Mr. Rothwell, honorary secretary; Mr. Bobert Crozier, treasurer; and Mr. H. H. Hadfield, literary secretary.

The proposed Gallery of Art for Liverpool.—This subject has been again ventilated a little in the town council; but Mr. Picton did not think the present time a propitious one to urge the question, as he had so often done on previous occasions.

The Nottingham School of Art. — The annual distribution of prizes has been made by Mr. Justice Mellor. There was a large attendance, and on the platform were Lord and Lady Belper, Lady Mellor, Vice-Chancellor James, Mr. Mundella, M.P.; the Mayor, the headmaster (Mr. Rawle), the secretary (Mr. Goodyer), and various others. We have so often noted the good progress that is being made at the Nottingham School, that we need not enter more particularly at present into details; but we may remark that in the annual report of the Governmental examiners, just published, the Nottingham School of Art has received special notice, as follows:—

"We have again to express regret that the study of elementary design, by the filling of geometric forms with ornamental details derived from the analysis of flowers and foliage, has been attempted in but few schools. It may be observed that the Local School of Art of Nottingham, in which this is best done, is also the most successful in applied designs. In an extensive competition of good designs for lace, &c., we found an opportunity for numerous awards, which were called for by the successful manner of treating the floral forms, judiciously selected as the materials for most of the designs for these delicate fabrics. (Signed.) Sir Francis Grant, P.R.A.; J. C. Horsley, R.A.; Richard Westmacott, R.A.; F. R. Pickersgill, R.A.; Sir M. Digby Wyatt, F.S.A.; E. J. Poynter, A.R.A.; Richard Redgrave, R.A.; and Henry Bowler."

The Leicester School of Art.—The committee of this school have unanimously appointed Mr. Wilmot Pilsbury, one of the masters of the West London School of Art, as head-master of the school.

Science and Art Classes at Calne.—A preliminary meeting for the purpose of considering the desirability of establishing a Science and Art School has been held at the Institution, Calne. Lord E. Fitzmaurice, M.P., presided; and after considerable discussion it was agreed to start (in the first instance) with night-classes for drawing, and day-classes for such persons as were desirous of receiving instruction in art, but for whom the Government would not make any payment. A subscription list was opened to meet the preliminary expenses, and Mr. Buckmaster was invited to deliver a public address on the industrial advantages of science and art knowledge, and the conditions on which aid was given by the Department to night-classes established for instruction in science and art. The inaugural meeting has since been held in the Lecture-hall. There was a good attendance of young men. Mr. Buckmaster addressed the meeting at considerable length, and a brief discussion followed.

The Stoke and Fenton School of Art.—A public meeting of the friends and supporters of this institution has been held in the Town-hall, Stoke-upon-Trent, under the presidency of Sir C. B. Adderley, M.P. There was not a large attendance. According to the report:—

"The average attendance of the students has been, in 1868, on the books, 101; 51·5 monthly. In 1869, on the books, 95; 52·7 monthly. Although the numbers on the books were greater in 1868, the monthly attendance has been higher during the present year. Under the system adopted by the Department of Science and Art, the examinations in March are conducted by members of the committee, and include freehand geometry, perspective and model drawing. In 1868, 37 students were examined, 27 of whom passed successfully, and 7 obtained prizes. In 1869, 26 students were examined, 12 passed successfully, and 1 obtained a prize. The April examinations are held in London, and consist of all the drawings executed by the students during the year. In 1868, the works of 81 students were sent up. 51 were satisfactory, and 4 prizes were awarded. In 1869, the works of 67 students were sent up. 64 were satisfactory, and 9 prizes were awarded. The prizes for the above examinations are in the form of books. A national competition then takes place, of all the works which have obtained prizes, from all the schools in the kingdom. 101 schools of art compete for 10 gold, 20 silver, and 50 bronze medals. Queen's prizes of books are not limited. In 1868, 1 silver medal, 4 bronze medals, and 1 Queen's prize were awarded to the school. In 1869, 1 bronze medal and 1 Queen's prize were awarded. There are also free studentships offered by the Department of Science and Art to the most advanced deserving students, to induce them to continue their studies. In 1868, 9 students were elected to this distinction. In 1869, 9 students were also elected."

The Rev. Sir Lovelace T. Stamer, bart., had offered two prizes for the best and second-best designs suitable for earthenware, value 3*l.* and 2*l.* These prizes have not yet been awarded. The treasurer, Mr. M. D. Hollins, offered two prizes for the modelling class. The first prize, of 3*l.*, was awarded to John Henk, for birds modelled from nature; the second prize, 2*l.*, was awarded to Thomas Longmore, for a modelled design for a vase. Prizes are again offered by Mr. Hollins to the same amount. The Department of Science and Art, in order to afford some slight encouragement to exertions on the part of the masters of schools, offer bonuses to the following amount, namely,—one of 50*l.*, three of 40*l.*, five of 30*l.*, ten of 20*l.*, twenty of 10*l.* In 1868, the master received as bonus the sum of 40*l.*, thus ranking the Stoke School as one of the best in the kingdom. In 1869, however, the committee regret that the master only received a bonus of 10*l.* The diminution of the bonus they can only attribute to the fact that, early in the year, the committee of the Wedgwood Institute, Burslem, being anxious to get up an exhibition of works of art for the inauguration of that institute, prevailed upon the committee to allow Mr. Bacon, the head master (who had had some experience in such exhibitions), to assist in getting up this exhibition.

Edinburgh School of Arts.—Sir William Stirling-Maxwell presided at the annual distribution of prizes to students of the Edinburgh School of Arts, and delivered an interesting address on art education. From a report read on the occasion by Mr. Bouverie Primrose, it appeared that the number of students taught in the central school during the year 1868-9, was 684, being the largest number on record. In addition there had been 1,261 students taught in various public schools of the city, being 204 more than in the preceding year. Among the prizes distributed were one silver and five bronze medals, out of twenty of the former and fifty of the latter, distributed among 103 Government schools. In the course of his address, on the subject of art education, Sir William Maxwell said,—Look at the state of architecture—that art by which a stranger first measures the artistic taste and capacity of a nation. In Edinburgh we may point with complacency to some of our public buildings, the works of Playfair and Bryce. Our western capital has its noble University, now rising in renewed splendour by the Clyde. But glance over to Paris, that great old town which within a few years has been turned into a huge new town, and is now supposed to be the modern Vanity Fair of the world. New Paris, no doubt, can boast of that noble breadth of space and carelessness of cost in which architecture delights, which a military despotism can command, and a municipal debt of 30 millions sterling can explain. But when we recover from the bewilderment into which we are thrown by miles of wide boulevards and leagues of monotonous streets, and examine the work in detail, I think the result is disappointment. I see no modern building new from the ground which will take rank with the old masterpieces. The great achievements of the Second Empire are the completed Tuileries and Louvre and the renovated Hôtel de Ville, and very noble works they are; but, grand as they are, they are nothing more than a skilful repetition of notes struck out in the sixteenth and seventeenth centuries, in which the ideas of olden architects are reproduced, and the H. and L. of the old French sovereigns replaced by the N. of the Corsican. In the chaos of ill-regulated boroughs called London, architecture has still less to boast of. Some fine private edifices in the City and West-end, always copied from old models, and a few colossal railway-stations, impressive by their vastness, are almost all the modern works we have to show to strangers. In my own time, the only national work that, in my opinion, may be considered a great success, is a single wall—the noble river-wall that now faces the northern bank of the Thames from Westminster to the Temple.

The Dublin School of Art.—The pupils have presented an address, with an accompanying gift, to Mr. R. E. Lyne, the head master, as an expression of their grateful sense of all he has done for their instruction, for the welfare of the school, and for the advancement of art in Ireland. In his reply Mr. Lyne said,—

"The pleasure you have experienced in a pursuit requiring in so high a degree a nice combination of the mental and practical, and so well calculated to develop the higher faculties of the mind and augment intellectual enjoyment, must increase along with a growing power of regulating detail by comprehensive generalisation, and the ability to combine in a greater or less degree the lessons of nature with the teachings of the æsthetic productions of all ages and countries: by such study only can you hope in the future to indicate the refinements and perfections of the age, or produce works that may testify in favour of our own time."

THE SEWAGE QUESTION.

The Thames Sewage.—The Board of Conservators of the River Thames, it is reported, intend to apply to Parliament next session for power, amongst other things, to prohibit the discharge of solid matter into the River Thames from the sewers and drains of the Metropolitan Board of Works, at Barking and at Crossness, and from any other sewers or drains belonging to them or any other body of persons; and to compel the Metropolitan Board of Works to deodorise or otherwise render innocuous the effluent waters or other liquid matters allowed to flow into the river.

Kidderminster and Leamington.—A few members of the Kidderminster town council have visited the Leamington A B C works, which are now dealing with the sewage of that town. The lessees have only got twelve months' liberty at Leamington, so do not feel justified in erecting machinery of great cost. The deputation saw the whole process by which the sewage of a town is restored into its component parts of guano, dried mud, and clear water. A goblet full of the clarified sewage water was quaffed by the visitors. No unpleasant sights or smells, it is said, were discovered. A farmer named Gilbert, informed them that he had dressed 3 acres of land—one with a ton of the native guano (or sewage deposit, after undergoing the A B C process), another with a ton of Proctor & Ryland's manure, and another with 30 tons of stable manure. The guano gave a crop of 18 tons to the acre, Proctor & Ryland's 15 tons, the stable manure 20 tons; but while the cost of the stable manure was 15*l.*, the cost of the native guano was only 3*l.* 10*s.*; the cost per ton of the guano at the works about a guinea, and it finds ready market at 3*l.* 10*s.* It is hoped that by means of the A B C, or some kindred process, the sewage of the town of Kidderminster may be diverted from the pollution of the river to some useful purpose. Some gentlemen are sanguine enough to think that the projected waterworks and drainage scheme may be rendered unnecessary by these means, and two of the gentlemen connected with the Leamington works have paid Kidderminster a visit to see what chance there was of their doing any good by offering to utilise what is at present a curse to the town.

The Pollution of the Trent.—A conference of the local governing bodies of the Potteries, convened by the Mayor of Hanley, has been held at Stoke-upon-Trent, for the purpose of considering the subject of the pollution of the Trent by the towns of Hanley, Burslem, Newcastle, Stoke,

Longton, Tunstall, and Fenton. Mr. Loch, Q.C., M.P., attended on behalf of the Duke of Sutherland, and stated that the condition of the river at Trentham had become perfectly intolerable. After a discussion, Mr. Loch submitted the following heads of a Bill, the expense of preparing which, he said, the Duke of Sutherland would be willing to undertake:—

"Clause 1. Prohibits draining into running streams. 2. Constitutes board representing all boards of health affected by prohibition. 3. Powers for board to devise means for disposing of sewage by (*a*) contract with persons or companies, or by (*b*) purchase of land and erection of works, for deodorising, &c. 4. Funds to be provided by the boards of health in proportion to district rate. Power to boards of health to borrow on rates or extension of their present powers if necessary. Separate penalty clauses for boards or individuals."

The meeting unanimously adopted the suggestion of Mr. Loch, and resolved to consider the draft Bill at a future meeting.

Sanitary Drainage at South Molton.—In a letter to the *Standard*, Mr. R. Ley, Mayor of South Molton, says:—

"About three weeks ago a paragraph appeared in your paper, stating that a complete system of drainage works had been carried out in South Molton which had proved self-supporting. From that time until now I have been in constant receipt of letters from all parts of the kingdom, numbering nearly a hundred, asking for information on the subject. I have, in fact, been so pestered that it has become quite a troublesome affair to me. Will you, therefore, kindly allow me to state in your columns how we have acted and how far we have succeeded. . . . . Our town is situated at the top of a hill, and we are surrounded by land in pasture well adapted for irrigation. We spent something over 2,000*l.* in our drainage works and in tanks for the reception of the sewage. We have sold one lot in perpetuity for irrigation at a distance from the town for 20*l.* per year: another lot for the same purpose, for a term of five years, for 20*l.* per year; and the soil from tanks erected for catching the same, for a term of five years, for the sum of 31*l.* 10*s.* per year. We are about to carry out a water supply for the town, which will doubtless dilute the sewage, and make it more valuable as a manure for pasture land. I have very little doubt but at the end of five years we shall get a larger interest for our outlay, but even at present I think we have nothing to complain of."

THE DARIEN CANAL.

THE inauguration of the opening of the Suez Canal, attended with such unusual splendour, magnificence, and cost, and witnessed by the representatives of the nationalities of Europe, having now passed away, and become a matter of history, allow me to observe that I think Great Britain—one of the first commercial nations of the world—did not figure in a very high or dignified position on that occasion. It is true H.M.'s representative was there, and a few of our distinguished scientific and mercantile men, but we had no high or especial representative like many other nations, although it must be known to the wide world that the success of that great work will confer far greater advantages on us than on any other people, in forming a shorter and direct route for shipping to our vast East-Indian possessions.

As our enterprising neighbours have shown us the way for a shorter route to the East, I was curious to see whether we should follow again in the wake in the canalisation of another isthmus, that of Darien, and I find they are again in the field with a project for that purpose; and the President of the United States, in his last address to Congress, made some allusion to it, although the Americans cannot now so much require it, since the opening of the railway from New York to San Francisco. The canalisation of the Isthmus of Darien has always been a favoured project of the Emperor Napoleon III., who has had lines, more than once, surveyed; but it has also been surveyed by other parties, and its expense estimated at about four millions sterling, or less than one third of the present cost of the Suez Canal.

There are several routes proposed for the canal across the Isthmus at Tehuantepic, Nicaragua, and through the Lakes, Chiriqui Lagoon, and Rio David; the Gulf of Darien, Caledonia Bay, to San Miguel, a distance of only 48 miles (mentioned in the *Builder*, p. 35, *ante*), and the Rio Atrata, over which a canoe has already passed from sea to sea, and a favourite line of Baron Humboldt's; but I do not think the surveys have been made with that care and accuracy to enable any party to compare their relative merits and advantages, to select the best and cheapest routes, and therefore new and comprehensive surveys will be necessary.

In addition to forming a better and nearer route to our western colonies, the Pacific, Japan, China, &c., the line of canal would open up the coasting of Central America, through which it would pass, afford ample room and verge enough for unlimited emigration to a thinly populated country possessing one of the finest climates in the world and a most productive soil, that will support the wants of man with little labour, and thus spread the blessings of commerce and civilisation westerly as the Suez Canal does towards the east.

Allow me to add, that it behoves the engineers of this country to look better after their interests and their laurels. Are not the leading great undertakings of the world falling into foreign hands? And our own Government are calling in Americans to carry out the Indian railways, and they have actually already employed an American engineer in one of our colonies; this, too, at a time when there is a dearth of employment at home, and men, the pioneers of civilisation, who have administered largely to the accumulation of wealth in this and other countries, are allowed to miserably decay, and capital is now lavishly embarked and frittered away in petty and unsubstantial telegraph schemes, or foreign (anti-British) loans.

B. BAYLIS.

THE STATE OF THE MARKET-HALL, CHESTER.

FROM the minutes of the Corporate Estate Committee, the town-clerk, at a recent meeting of the council, read that Messrs. Johnson and Ellington, engineers, had made a careful examination of the market-hall roof, and in their opinion the breakages resulted from the following causes:—

1. The want of diagonal stays in the roof, which allowed the principals to move laterally, thus disturbing the glass and slates. 2. The want of strength in the T iron sash-bars and the ridge pieces, as evidenced by the present state of the skylight. 3. The too great width of the glass in proportion to the strength of the sash bars. 4. The want of more or else stronger clips at the bottom of the squares of glass, which had given way, sliding downwards from the rabbet on the ridge piece. 5. The slating also wanted attention, and there are a good many loose slates. The woodwork of the louvre also wanted painting badly. There was also a quantity of dirt in the lower gutter, which, if not periodically cleared out, would get into the columns which formed the down-spouts.

Messrs. Johnson and Ellington said they calculated the cost of the alterations and additions to the market-hall roof at 515*l.* In this estimate they had not added anything for the risk of breaking in cutting the squares of glass, but that with care they believed would be small. They also had not taken the slating and painting into consideration, with the exception of painting the whole of the new ironwork and the old sash-bars. Surprise was expressed at the sum required to repair a building only five years old. After some discussion, it was resolved to refer the matter back to the committee, with instructions to communicate with the architect. Alderman French said that though they might get the opinion of the architect, they could not attach any blame to him.

THE PHANTOM OF THE SEWER.

IN your first impression for the new year, Mr. Elliott has given us much sound advice on the ventilation of sewers, which, if carried out, would, ere the close of the year, drive many of our medical men into the Bankruptcy Court. But while we admit that our poisoned houses kill their thousands, let us not forget that our poisoned streets swell still more the undertakers' gains. There is a phenomenon occasionally produced in our streets, which (while the causes are allowed to exist) I would were more often apparent. I allude to the steam which any one may sometimes see, especially in November, issuing from many of our street gullies. What is this steam? whence comes it? and whither does it go? It is nothing less than relapsing and other fevers, in vapoury forms, seldom seen because the state of the atmosphere rarely is favourable to its appearance, but still always hovering about us. If it were to be seen every day, abler pens than mine would, ere this, perhaps altogether have stopped the evil; but it is not so: this phantom fever rises up unseen (though not unsmelt) among us, spreading infection, disease, and death. There is little doubt whence it comes. Direct from our sewers and drains this concentrated essence of disease arises, polluting the air with its poison, and freely entering the lungs and blood of its victims. The task of preventing this is not beset by any very serious difficulties. We have only by a suitable system of exhaust to turn the almost general updraught from our traps and gullies into a steady downdraught into them, and the gases generated in both our sewers and streets, so antagonistic to health, and so obnoxious to our nasal organisation, might be brought entirely under control, and if possible be utilised, but certainly destroyed. This project I believe to be very old; but, for the welfare of the public, I ask you again to bring it under their notice.

W. F. C.

THE WESTMINSTER STATUE AT CHESTER.

SOME months ago, as we mentioned, it was reported that a defect had been discovered in the statue, by Thorneycroft, of the Marquis of Westminster, which occupies a prominent position in the Grosvenor Park, Chester, and which was pronounced at the time of its inauguration the largest marble statue, from one block, in the kingdom. It seems from what transpired at a recent meeting of the Chester Town Council, that with the exception of a piece which had been let in to the left shoulder of the figure, the statue is out of a solid block of Sicilian marble. The late frost had rendered the piecing distinctly visible, and very much marred the sculptor's workmanship. Mr. Thorneycroft has explained that the insertion of the piece in the left shoulder was occasioned by the discovery of a flaw when the block was being worked; that such an insertion was common; and that he was engaged on several statues for the Prince Albert memorial which would have to be completed in the same way. Considering that the block was excellent, with this exception, he thought it would not be judicious to obtain another block from the quarry, which his contract with the merchant would have permitted him to have done without additional cost; and he therefore proceeded with the work, especially as the committee urged him to get it finished during his lordship's lifetime. An arrangement has been come to between the committee of the subscribers and Mr. Thorneycroft for the latter to make good any damage arising from the insertion of the piece in the shoulder. One or two of the members of the council expressed the disappointment which was felt by the public at learning that the statue was not, after all, as they had been led to believe, out of a single solid block of marble.

The present Lord Westminster, in a letter, admitted there was a difficulty, but said somehow or other the Greeks and Romans got large blocks two thousand years ago, and perhaps in a thousand years hence we might be able to do the same. He did not consider the flaw so slight a matter as was endeavoured to be shown.

"THE FLEET."

IN answer to your correspondent "Camden," the "Fleet Ditch," or rather let us call it by its true name, the "Holebourne," is carried beneath the Regent's Canal a little to the east of Camden-street, between it and Camden-road. The Highgate branch has its main sources by Kenwood, forming the five large ponds in that locality. The rillet from the vicinity of the cemetery is very unimportant.

J. G. WALLER.

THE TREATMENT OF SEWAGE WITH CARBON.

SIR,—As the sewage question very properly occupies a prominent place in your columns, may I be allowed to call attention to a very simple process, which for several months past has been in operation in this district (Newcastle).

Having carefully watched the working of this plan for nearly three months, and tested the results in various ways, I am sanguine enough to believe that it will prove very valuable. It is the subject of letters patent, and proceeds mainly on the well-known properties of *charcoal*. Coarse carbons in the shape of coke or waste cinders are so disposed in a preliminary tank as to retain all solid matter contained in the sewage, the effluent water from which is conveyed through a series of smaller tanks charged with finer carbons; the last of the series containing chiefly vegetable or animal charcoal, or a mixture of both. All the tanks are closely covered in, and the contents of the smaller tanks are from time to time emptied into the large preliminary tank, until the same is full; which, after being drained off, may be emptied, and the contents carted away as a valuable manure. I have been present this week during the emptying process, and can testify that so completely has this carbon done

its work, that not the slightest nuisance has been created.

As regards the value of the manure, I may mention that it was carefully tested this last summer in the growth of swedes, cauliflowers, &c., side by side with the best Peruvian guano, with results which surprised every one. The crop yielded at least 20 per cent. more weight than that from the guano.

The plan is now in operation at the Stoke Parish Workhouse, and the guardians of the said parish, after prolonged and careful testing of the plan, have shown their confidence in the same by entering into a thirteen years' contract with the patentee. E. JOHNSON.

ST. MARY'S CHURCH, MISTLEY, ESSEX.

THE old parish church of Mistley, in the Italian style, with a tower at each end, having been found to be in a dilapidated condition, involving the necessity of reconstruction, the Rev. C. J. Norman, of Mistley-place, gave a site in the park on the new road recently opened by him from Mistley to Manningtree, and a new church was commenced in December, 1868. It is in the Early Decorated style, and has a total length inside of 100 ft. 6 in., of which the chancel occupies 27 ft. 6 in., and a total width, including the nave and the north and south aisles, of 51 ft. 6 in.

At the north-west angle stands the tower, vaulted inside with stone ribs and groined ceiling, forming the principal entrance. The chancel and organ-chamber are both terminated with a semicircular apse, and the former is pierced with seven windows, three of which are filled with stained glass.

The church is constructed with Kentish rag-stone walls and Bath stone dressings; the roofs are slated; those over the nave and aisles are open timber-work, while the chancel has a panelled ceiling, divided with arched ribs, springing from carved stone caps and Purbeck marble shafts. The chancel arch is ornamented with carved stone corbels and Lizard serpentine shafts, and the columns on which the arches for the clearstory rest are of Mansfield red stone. The body of the church is seated with open benches, the passages between the sittings being paved with Burslem tiles, and the chancel with Maw's encaustic tiles. The structure is heated throughout with hot-water pipes, fitted by Messrs. Dennis & Co., of Chelmsford. The stone pulpit was the gift of Mr. Munn, of Manningtree, and the font was presented by Mrs. Norman.

Accommodation is provided for 540 adults and 60 children, 500 of the sittings being free. Messrs. Wadmore & Baker, of London, are the architects; and Mr. Hawkins, of Monks Eleigh, is the contractor. The amount of contract, allowing for the materials of the old church, is 4,367*l.*; and for the completion of the spire, 790*l.* The latter feature will have a total height of 142 ft.

DERIVATION OF THE WORD IRELAND.

KING ALFRED'S word, *Ira-land*, being a translation, carries us back to Greece and Rome for our derivation of the word "Ireland." Onomacritus, an early Greek writer, who occupies, with respect to the fabulous Orpheus, the same position that Macpherson occupies with respect to the mythical Ossian, has the word Ἰέρνισιν: archaic Greek for the western islands of the blessed. This was Latinised as *Ierne*, and appears so in Claudian: unquestionably applied to Ireland.

The Greek root ἱερος means "holy," as in hieratic, &c.; it is identical with the Hebrew, and has also formed the Latin *ira*, whence our words "ire," "irate," = "wrathful." I do not, however, at all suppose that Ireland was really the "blessed or sacred isle" at any time; but Homer and other early poets always fabled the existence of such a place, longed to discover it, and located it just outside the boundary of real knowledge. Thus early Mediterranean voyagers, as, one by one, they exceeded the bounds of previous knowledge by means of more extended excursions, failing to reach the reality, but still pursuing the ideal, ended lastly at Ireland; that place, as latest inheritor of the name, has retained it longest. The native Irish word is "Eire" or "Eirinn": apparently without any definite etymon, except that *iar* is "west"; but that is not the word.

To the Welsh, Ireland is "Gwerddon," or "Iwerddon" (green isle): a mere poetical term; and the Irish are "gwyddyl" = savages. This last term must be deemed an expletive, indicating national animosity; as the English are the hated *Seisnaeg*, or *Sasunnach*, to both races. A. H.

DRAINS AND CESSPOOLS, CAREY-STREET.

SIR,—In the matter of the Law Courts site, may I suggest one cause for complaint on the part of its surrounding inhabitants, and which, I believe, is the creator of a deal of the fever and illness that have prevailed, and still exist, round that spot?

Beneath the present waste ground are drains and sewers innumerable, which, from the mass of people that lived over them (of the poorest kind), has the incrustation of years and years of use; and, I have not a doubt, the soil surrounding the said drains in many places is like a cesspool. We all know the effect of opening disused cesspools, in regard to the danger that arises to health, and taking into consideration that the air is constantly flowing through these sewers and drains, absorbing the fœtid and putrid matter, and thence percolating into the surrounding houses, there, in my belief, is the cause of fever and death. The whole of last summer the stench round this spot was a caution. I had my own family stricken with fever, and in this street there have been several severe cases since. If this takes place amongst well-to-do people, how must it fare with the poor that inhabit Maiden-lane and other thoroughfares and courts adjoining? ELREED.

BAYHAM ABBEY.

ON Thursday, the 13th inst., the first stone of a new mansion was laid at Bayham Abbey, near to Tunbridge Wells, by the Marchioness Camden. The workmen, to the number of eighty, were afterwards given a half-day's holiday, and were treated by the Marquis Camden to a supper, under the chairmanship of Mr. French, the clerk of the works, and Messrs. Trollope & Sons' foreman.

The building, designed by Mr. David Brandon, will be completed in about two years. A detached chapel will also be erected in the park, between the ruins of the abbey and the site of the new mansion. These ruins, which are of Early English period, and of much interest, may be seen two days in the week, and are visited by many persons from Tunbridge Wells and the neighbourhood, the distance from the wells being a pleasant drive or walk of five miles.

CASES UNDER METROPOLITAN BUILDING ACT.

District Surveyor of St. James's v. *Strode & Co.*

SIR,—As you have allowed the supplementary statement made by the District Surveyor of St. James's to appear in your columns, we trust, with your usual impartiality, you will allow us a few words on the same subject; as although generally, and in most of the important particulars, it agrees with your former report and with the facts of the case, there are some remarks which we cannot allow to go unchallenged.

In the first place, we are described as "tradesmen expressly refusing to be sub-contractors;" and further on, as "absolutely declining, for private reasons, to surrender our independence:" the real facts of the case being that we were not asked to be sub-contractors; but, as is the case generally, we were simply ordered by the architect to provide and fix the sun-burners in conjunction with the builders, who were ordered to cut away and trim the joists, flooring, and other woodwork, and to make good the same after our apparatus was fixed.

The report says that on Mr. Knox dismissing the summons, our counsel, Mr. Warner Sleigh, applied for costs. This was not so. Mr. Knox simply said the summons must be dismissed, but without costs, and Mr. Warner Sleigh immediately expressed our satisfaction with the decision.

It is quite true costs were asked for, but it was before the case had commenced; and under these circumstances, Mr. Warner Sleigh thought it right to inform the magistrate that the case was one of some importance, and that in the event of his giving an adverse decision his clients had instructed him to ask for a case for appeal. After hearing this, the District Surveyor said he would withdraw the summons for the penalty, and summon us again for the fees only; there being no appeal against the magistrate's decision as regards fees. Mr. Warner Sleigh then said, as his clients had incurred considerable expense and loss of time, he thought it only just to ask that, in the event of the summons being withdrawn, their costs should be allowed. Mr. Knox intimated he should certainly allow them; and that moreover, although there was no appeal against his decision as regards fees, he could, and certainly should if asked to do so, state a case on the point of law which governed his decision, to be argued before the judges.

Under these circumstances, the District Surveyor elected to go on with the case, which ended by Mr. Knox dismissing the summons.

Now as to the "impressions" left on the mind of the District Surveyor as set forth in the note at the end of the statement. He says that the invention, *i.e.*, the sun-burner, has come into use altogether since the date of the Act, and that the clause which is supposed to apply (as to pipes for conveying heated air) "was really directed at nothing of the kind."

We fixed the first sun-burner ever seen in London at the Reform Club, in September, 1852, under the direction of Sir Charles Barry, and many others were fixed in the same year.

The Building Act bears date 1855, and the clause which is supposed to apply states—"No pipe conveying smoke, or other products of combustion, shall be fixed nearer than 9 in. to any inflammable substances."

If the District Surveyor thinks this clause was not directed at sun-burners, where is his authority for any interference at all? STRODE & Co.

District Surveyor of Whitechapel v. *Holland & Hannen.*

THIS was a summons taken out, at the Thames Police-court, by the District Surveyor of Whitechapel against Messrs. Holland & Hannen, builders, for erecting a warehouse in Leman-street, Whitechapel, contrary to the provisions of rule 4, section 27, of the Building Act.

Mr. Reginald Ward, Assistant Solicitor to the Metropolitan Board of Works, appeared to support the summons; Mr. Serjeant Sleigh appeared as counsel for the defendants.

The facts of the case were that Messrs. Holland & Hannen had erected extensive warehouses in Leman-street, which were divided above the basement by party walls, so as to contain three compartments, each of them somewhat less than 216,000 cubic feet. The basement running under the whole building, and containing 130,000 cubic feet, was divided from the upper floors by horizontal arches on iron girders, and had no communication therewith, the only access to the basement being from the exterior of the building.

Mr. Ward argued that, having regard to the definition of the words "party wall" given in sections 3 and 17 of the Act, the basement was not divided from the upper floors, as required by the 4th rule, and its contents would therefore, have to be added to each of the upper divisions, so that each would contain considerably in excess of 216,000 cubic feet. It was further argued that rule 3 of the 27th section was not intended to limit the application of rule 4, but that it applied more particularly to buildings occupied otherwise than as warehouses,—as, for instance, to model lodging-houses and chambers with separate entrances.

Mr. Serjeant Sleigh argued that in calculating the cubical contents of each division of the building, the basement should be excluded, the division between it and the upper floor being complete. Counsel also argued that the case fell under rule 3; and as the basement had a separate entrance from without, it was a building separated as required by section 27.

The Magistrate, Mr. Lushington, decided that the basement was not divided by a party wall, and must, therefore, in ascertaining the cubical contents of the building, be considered part of each set of warehouses above. The Magistrate also decided that rule 3 did not exempt the defendants from compliance with rule 4. An order was therefore made upon the defendants to divide the building by party walls in such manner that the contents of each division should not exceed 216,000 cubic feet.

NEW BRITISH INSTITUTION.

THERE appears to have been a split amongst the artists who opened the first exhibition in Bond-street. So now, instead of one, two societies are to be formed. This is greatly to be regretted, and should be avoided if possible. One, of course, will have to yield ultimately, and it may as well be done first as last. Two cannot flourish; one may and should. The title "New British Institution" is wisely adopted by those who have engaged the Gallery at 39, Old Bond-street, seven doors from Piccadilly, and they propose the following rules:—

1. An acting committee of selection and arrangement will be elected by the artists promising contributions from a list of candidates to be forwarded by letter.
2. The claims of every contributor's work will be decided on the ground of merit alone. No rights or privileges in the Exhibition can therefore be allowed to members of the committee, guarantors, or others.
3. No more than two works by any contributor will be placed, and no greater number will be received.
4. A financial committee will have control over expenditure and receipts.

A guarantee fund is being raised, and a strong list of supporters is published. Mr. Gullick acts as honorary secretary.

ABOUT CAMEOS.

THE name of Ronca is known in part of the are world, and his works have been admired ant praised by some of the best judges in Englandd A few years ago he obtaineda prize of five guineas from the Society of Arts, for a cameo of the Queen and Prince Consort, and was mentioned in terms of high commendation in the *Art-Journal*, of September, 1865. Her Majesty also expressed her approval of his work, and gave him an order, which was very gratifying to him. Yet, M. Ronca remains comparatively unnoticed, but few of the public being aware that we have among us an artist in cameos of superior merit. His designs and workmanship are excellent, and I feel sure that, could his name be brought more prominently before the world, he

would obtain many patrons. By kindly giving this little notice a place in your widely circulated journal, you will confer a great favour, and do more to promote the desired end than any other means that could be suggested. M. Ronca resides at 42, Blantyre-street, West Chelsea, and a visit to him would repay any art-lover for the trouble. It is surely a mistake to allow such a man to struggle through the best years of his life in obscurity, and only to find out his merits when the finger of fashion may point the way; when his hand may have lost its cunning; and, so far as the artist is concerned, it may be "too late." E. S. P.

ARCHITECTURAL ART CLASSES.

THE arrangements for establishing drawing, colouring, and modelling classes for architectural students are making progress. A joint committee of the Royal Institute of British Architects, the Architectural Association, and the Architectural Museum, have held meetings, and the outlines of a scheme have been prepared and discussed. The classes will meet in the Architectural Museum, and have the advantage of the collection there. Such of our readers as may be disposed to join the classes, would do well by at once sending their names to the Museum, as willing to look to the terms when published.

THE LIFE-LINE FOR FIRES.

SIR,—I would beg to ask, through the medium of your journal, whether the life-line rocket apparatus, now in use for saving lives from shipwreck, might not be equally applicable to the rescue of lives from fire?

It appears to me that a portable apparatus of the kind, which would practically be able to convey a line to any height of story or roof that could possibly be required, might, in the absence of fire engines, or, as is more frequently the case, of water and fire-escapes or ladders, be the means of preserving many lives now lamentably lost? ALFRED JOWERS.

RATTENING IN SHEFFIELD STILL.

THE villanous scoundrels who disgrace, not only Sheffield, but all England, are still at their nefarious work. Several houses have of late been attacked and the contents destroyed. In one instance, the assailants attacked the wrong house, and did not discover their mistake until they had broken up everything within their power. As soon as a man omits to make his weekly payments to the trade secretary he is rattened. A young man in the employment of Messrs. Sorby has had a nut stolen, to prevent him from working, because, having spent the whole of his ready-money during the week of his honeymoon, he was not able to pay his "natty;" and another man, working for the same firm, has been threatened with rattening because he engaged one of his five children to help him at his trade without having first obtained permission of the union. To be secretary to such a union ought itself to be punishable. The *cat* would be the best rooter out of these *rats*, could she only get at them to claw their backs well. Every honest English workman should raise his voice against them.

SIZE OF MORTAR JOINTS IN BRICKWORK.

WILL you allow me to ask the following questions through your columns?

1. What is the best thickness for the mortar joints in brickwork?

2. What are the distinctive qualities of thick and thin joints respectively?

Mr. Street read a paper at the Institute a few weeks ago, of which a summary appears at page 959 of your last volume. With reference to Mediæval brick architecture as it appeared in various districts, that gentleman is reported to have said:—

"The development of each was different. . . . . But they, it seemed, all agreed that if brickwork is to be strong it must be built with an enormous quantity of mortar; and so, instead of specifying, as enlightened nineteenth-century architects do, that 'no mortar joint is to be more than ½ in. thick,' he thought, if we could find a Mediæval specification, we should find it ran in this form, 'No mortar joint to be less than ½ in. thick.'"

We might, perhaps, accept Mr. Street's dictum as to what is good brickwork without hesitation, if it only ran counter to the practice of those "enlightened nineteenth-century architects" who are thus set down so summarily by one of their own number; but *engineers* are generally supposed to know something of good building at least, and Professor Rankine is the latest authority in the engineering world. What, then, are we to think of extracts such as this, which is from Rankine's "Civil Engineering," p. 393?

"The following principles are to be observed in building with bricks:— . . . . To fill every joint thoroughly with mortar, taking care, at the same time, that the thickness of mortar shall not exceed about ¼ in.

In order to prevent the use of too great a thickness of mortar, it is usual in specifications to prescribe a certain depth which a certain number of courses of brickwork shall not exceed."

The question at issue is of considerable importance, and, if it involves the relative merit of Mediæval and modern brickwork, is also of some interest. I therefore hope that some of your correspondents may throw further light on the matter. W. W. R.

*** The question was treated of in the *Builder* long ago, with some strong opinions in favour of large mortar joints: it may be usefully re-opened.

COMPETITIONS.

New Infirmary, Eastry, Kent.—The Guardians of the Eastry Union in November last invited four or five architects to prepare designs for a new infirmary, capable of accommodating 100 patients, to be built on a portion of the present workhouse grounds. The designs of Mr. T. E. Knightley, of Cannon-street, City, were selected by the Guardians on the 12th inst. The drawings are now before the Poor Law Board for their approval.

Plymouth Guildhall.—At a meeting of the town council, on the 12th, a letter was read from Mr. C. F. Hayward, to whom the second premium was awarded, arguing, on the ground of admissions made by the referee, that his design should be carried out instead of that of Messrs. Norman & Hine. The council then proceeded to consider the general question, the proposal to erect a new guildhall. After a very long discussion, it was resolved:—"That the council do proceed to carry into execution the erection of a new guildhall, and that a committee be appointed, with the necessary powers to give effect to this resolution, subject to the further approval of the council." This remits the question to the committee as to the plans, the mode, and the time, subject to the approval of the council.

RE-OPENING OF HOLY TRINITY CHURCH, GUILDFORD.

THE church of the Holy Trinity, Guildford, has been re-opened for divine service, having in that time undergone much internal alteration, improvement, and embellishment. Since the opening of the church in 1763, nothing, except perhaps a little painting and varnishing, has been done to the building; and, of course, in so long a period the place had got dirty and out of order. The galleries, too, were inconvenient, and the pews unsightly and much too high. Measures were taken to obtain the necessary funds for carrying out the object sought. Designs were submitted by Mr. Woodyer, of Graffham, architect; these were approved, and the church was closed for the work of restoration to commence in the spring of 1869.

The old galleries on the north and south have been removed, the whole of the windows have been altered, and glazed with slightly tinted glass arranged in geometrical pattern. The pews have been lowered 6 in., and revarnished. The organ has been removed from the gallery and placed in the north aisle close to the choir. It has been reconstructed by Messrs. Bevington & Son, of Soho. The chancel portion of the church has undergone a renovation. The arch is ornamented with an artistic bordering in ecclesiastical design, with blended colours, by Mr. Gray, of London; while the dome is painted deep blue, with stars of gold. The panels of the chancel recess were also decorated by the same gentleman. Each panel bears in its centre a double triangle, surmounted by a cross, gilded and shadowed, the edges of the panels being similarly coloured. The chancel and aisles are paved with glazed tiles, after the design of Mr. Woodyer, those in the aisles being arranged in geometrical pattern. The communion recess is enclosed with a light railing of blue and gold, with a crimson velvet rim. Two new windows have been added on each side of the great window in the chancel; and the choir stall has been placed outside the communion recess near the organ. The reading-desk, pulpit, and clerk's desk have both been lowered. "Old Weston's" Chapel, which was nothing but a mortuary, has, with the consent of the owners, been floored and converted into a vestry. The two old chandeliers, which were formerly used for lighting the church, have been converted into gaseliers which afford an improved light. The western gallery has been reseated, and contains 150 free sittings, thus making the building capable of containing 650 persons. The whole of the works hrve been executed by Mr. William Pimm, of Guildford, under the direction of Mr. Woodyer, architect.

CHURCH-BUILDING NEWS.

Caunton (*Notts.*) — St. Andrew's Church Caunton, has been restored and re-opened. The church is situated in the centre of the village. The edifice consists of nave, chancel, north and south aisles, and a small chancel aisle, of somewhat ancient appearance. The edifice is described as having been in a deplorable condition before the present restoration. It was filled with old pews; there was a gallery at the east end; the roofs were flat; and the whole sadly needed the hand of the restorer. The chancel has been entirely rebuilt at the cost of the Ecclesiastical Commissioners. The north wall has also been considerably altered and strengthened. The interior walls have been scraped and renovated, the belfry arch brought out to view; the old pews have been replaced by new and open deal seats—the old-fashioned pulpit and reading-desks replaced by a new lectern and pulpit. Inside the communion-rails encaustic tiles have been laid, and the altar is a new one. Accommodation is provided for above 300 persons. It is intended, we believe, to make the seats free and unappropriated, and to depend on the offertory for support. The architect of the work has been Mr. Christian, of London; and the builder Mr. Clipsham, of Norwell. The cost of the restoration will be about 2,000*l*.

Toller Whelme.—In the hamlet of Toller Whelme has just been opened a new church, constructed at the sole expense of Mr. William Pope. He has endowed as well as erected it for the benefit of the labourers in his employ. St. John's stands on an elevated piece of ground, near the residence of Mr. Pope. It has nave and chancel, with a vestry on the north side, and a tower at the south-west corner. Its dimensions, excluding the tower, are 50 ft. by 20 ft. Local stone has been used in its construction, and there are Ham-hill stone dressings. Crosses of Ham stone ornament the slated roofs. The windows in the nave have foliated headings. The east window has three lights, and the west window has two, with foliated headings. The porch is lighted by means of a couple of small lancet windows with stained-glass borders. In the nave are open benches of stained deal. The chancel is paved with encaustic tiles. The altar, constructed of oak, and separated by oak rails, is the gift of the Corscombe parishioners. On the stained-glass east window is represented "The Crucifixion." Surmounting it is a foliated circle, within which is the figure of an angel, with a "crown of glory." Of angels bearing scrolls there are representations in two other circles. A representation of Christ on the cross appears in the centre, and there are figures on each side, and weeping angels above. The nave has an open stained deal roof, the plans for which were prepared by Mr. Warr, formerly of Corscombe. Mr. W. Holland, Warwick, supplied the east and nave windows; Messrs. Cox & Son, of London, the west window. There is but one bell in the tower; but Mr. Pope hopes to see the belfry furnished with a peal. Mr. R. Chedd, of Rampisham, did the masonry, and Mr. Saunders, of Beaminster, the carpentering; Mr. Chick, of Beaminster, constructing the pulpit. The entire work has gone on under the personal superintendence of Mr. Pope.

Silton (*Dorset*).—The parish church of St. Nicholas has been re-opened, after having undergone a restoration and repair. As it now stands, the church is without any enlargement, which is unnecessary. All the original architecture has been reproduced. The open oak roofs, with their carved bosses, have been exhumed from their plaster obscurity, the principals cleansed and divested of their whitewash coats, and the whole restored. The pews have been superseded by open benches of oak, and the floors repaved. The chancel is divided from the nave by an arch whose span opens to view the east window. There is a

step ascending to the chancel, and another at the altar-rails, whilst around the communion-table is a footpace, so that the ascent from the nave to the altar places it within view of all the congregation. The floor of the chancel has been laid with tiles, supplied by Mr. Godwin, of Lugwardine, who also supplied the plain red tiles with which the floors of the nave and aisle are paved. An improvement to this part of the church was the removal of the massive monument to Judge Wyndham, which formerly occupied the south end of the chancel. By the removal of this block of masonry some features of the architecture have been "unearthed;" and the monument itself is seen to greater advantage in the recess which has been prepared for it in the north wall, immediately opposite the main entrance to the church. By the removal of this block an old window was found in the south wall, which has been restored and filled with stained glass. In the corner was also discovered an old sedilia and a piscina with credence-table, whilst a hagioscope, looking into the south aisle, has also been found, and the obstruction removed. The additional light thus obtained, as well as the finding of these old features of interest, have repaid the labour and expense of removing the monument. On the north side of the chancel is a chantry, which contains a fan-traceried roof, and this has been reproduced after the original style. This apartment, which is used as a vestry, is lighted from the chancel by a Perpendicular window with four compartments, filled with figures of Paul, Timothy, Barnabas, and Luke, in very old stained glass. In the corner of the chantry is a piscina and credence-table, somewhat similar (though not so large) to those in the chancel. The old stalls in the chancel have been removed, and their places supplied by benches of oak, pierced with Perpendicular tracery, and carved ends. The "parish pounds" have also been superseded by open seats of oak. The space under the western tower was formerly filled by the organ and chamber, over which there was a small gallery; but these have all been removed, and the large west window is now seen to advantage, while the school children have seats provided for them, and the ringers have ample room for their work. There is a Perpendicular font near the entrance, which is by the south porch, and this has been furbished up so as to present a uniform appearance with the rest of the building. The windows in the north wall are filled with plain cathedral glass, but all the others are specimens of window-staining. Several pieces of stained glass were found during the restoration, very much, it is said, of the colour of those recently supplied by Messrs. Clayton & Bell. The decoration of the chancel roof was carried out by Mr. Daniel Bell, by whom the carving and stencil-work has been restored. A quantity of old coins, including a Queen Anne's sixpence, have been found during the restoration, as well as a stone coffin, which was discovered about 1 ft. under the door of the church, and contained a skeleton, with the head turned aside, suggesting the idea that the body had been interred alive. Some tesselated pavement, in a perfect state of preservation, with the royal arms quartered on it, was also dug out; but the coffin alluded to has not been disturbed. The church is to be warmed by hot-water apparatus, supplied by Mr. Richardson, of Wincanton; and every appliance for ventilation has been provided. Mr. Alfred Bell, of the firm of Clayton & Bell, contributed five windows, including that in the chancel, which contains three subjects—the Crucifixion, the Transfiguration, and the Ascension; Mrs. Martin and Mrs. Percy (the rector's mother) each gave a window on the north side of the chancel; Miss Grove placed a stained-glass window in the western end, the subject being the Last Judgment; and the rector one in the south wall of the chancel. The whole restoration has been carried out under the direction of Mr. C. Buckeridge, of London and Oxford, architect. The contract for the building was taken by Messrs. Farthing & Doddington, of Mere, by whom the work has been executed. The organ formerly used in the church had become dilapidated and feeble in its tone, and, to add to the importance of the work of restoration, a new instrument has been procured from the well-known firm of Sweetland, of Bath. The organ cost 160*l.*

Raughtonhead (*Cumberland*).—The new church of St. Jude's, Gatesgill, has been consecrated by the Bishop of Carlisle, as a chapel of ease to the parish church of Raughtonhead. The site was presented by Colonel Salkeld, of Holm Hill, who, together with Miss Salkeld, was one of the principal promoters of the new church, and in addition to other gifts, subscribed liberally. The new church is situated upon the descent of the hill, before entering the village. The style of architecture adopted is Early English. The plan comprises nave, 45 ft. 6 in. by 24 ft. 8 in.; with chancel, 22 ft. by 14 ft. 6 in. The vestry and side chapel adjoin the church, and are roofed transversely. The side elevations are divided into bays by buttresses, with lancet coupled windows. On the south elevation is an entrance porch. The lower part of the west elevation is pierced with three lancet windows, with large circular window in the gable; and rising from the south-west angle is an open belfry, with slated roof, terminating with a gilt cross. The east elevation has three lancet coupled windows, filled in with stained glass. All the external walls are built with the local stones, quarry-faced, relieved with tooled bands. All the gables have stone crosses or gilt terminals. The interior walls are plastered. The roofs are high-pitched, open, and with framed principals, stained and varnished, and covered with slates of two colours, with enriched cresting. The seats are of pitch-pine, fitted with book and kneeling boards. The stalls in the chancel are moulded, also of pitch-pine. The chancel is laid with encaustic tiles, and the windows filled in with stained glass by Mr. Wailes, of Newcastle-upon-Tyne. The heating apparatus is supplied by Haden & Son, of Trowbridge. All the seats are free and unappropriated, affording accommodation for 150 persons. The site is surrounded with a stone wall, crested with wrought-iron railing. The stained-glass window in the chancel is a memorial window, placed there by Mr. Thomas Salkeld Bramwell, in remembrance of his parents. The subject is the Birth, Death, and Ascension of Christ, each incident occupying one of the large lancet panels. The large circular window at the west end of the church was presented by Miss Salkeld, of Holm Hill. The contractors for the building were Messrs. Bragg, Wilson, & Baty, of Gatesgill; for the carpenter and joiner work, Mr. T. Ward, of Raughtonhead; slating, Mr. Nanson, Carlisle; plumbing and glazing, Messrs. Thomson & Sons, Carlisle; plastering, Messrs. Johnston, Bros.; ironwork, Mr. Thomas Corbett, Carlisle. Mr. John Lowe, of Manchester, architect, supplied the design for the building. The church was built of stone from the quarries in the neighbourhood. The outlay, including boundary-wall, &c., has been 1,280*l.*

Droylsden.—After extensive alterations St. Mary's Church has recently been again opened for divine service. The south entrance has been closed, and the porch converted into a baptistery, and laid with encaustic tiles. Two new entrances have been made at the west end of the north and south aisles respectively. The seats under the gallery have been brought forward, thus doing away with the passage which led across the church from the south entrance. The old reading-desk has been removed, and the seats allotted to the female teachers and select class in the Sunday School extended. The capitals of the columns and other stonework which had been left uncarved, have been carved, and the whole of the church relighted by coronæ, manufactured by Messrs. Hart, Son, Peard, & Co., of London. The chancel has been tiled with Minton's encaustic tiles, and re-seated, and the whole building re-coloured and cleaned. The entire cost of the works will be about 800*l.* They were done under the superintendence of Mr. G. J. Redmayne, Manchester, architect.

Adisham.—The parish church has recently been restored and re-opened. The cost of the work done is about 2,000*l.* Funds are wanted for the completion of the decoration. The architect was Mr. Wm. White, of London; and the work was carried out by Messrs. Denne, of Walmer.

Blyth, Northumberland.—The prosperous little port of Blyth, celebrated for its steam coal, is about to erect a new Presbyterian Church. The structure will be built of brick, with terra-cotta dressings, and will have a tower and spire at the south-west angle. Mr. Thomas Oliver has been appointed the architect.

Crosshills.—The new church of St. Thomas, Sutton, Crosshills, has been consecrated by the Bishop of Ripon. Situated in the extensive parish of Kildwick, the township of Sutton, embracing a population of 2,200, has hitherto been without a place of worship in connexion with the Church of England, other than the school-room. The parish church of Kildwick was found to be situated at too remote a distance to be made available for the requirements of the scattered district of which Sutton is the centre. The late Mr. T. B. Bairstow, of Sutton Mill, made a bequest of upwards of 3,000*l.*, for the purpose of erecting the new church of St. Thomas, besides leaving a further sum of 1,000*l.* for the endowment of the living. The intention of her deceased husband has been carried out by Mrs. Bairstow, and hence the new building. Built in the Geometrical style of architecture, the new edifice comprises nave, north and south aisles, organ chamber, north chapel for vestry, and south chapel for school children. A tower, 60 ft. high and 14½ ft. square, is placed at the west end of the building. It is surmounted with embattled parapet, with carved and crocketed pinnacles, and provision is made to carry up a spire to the additional height of 60 ft. at some future time. The extreme length of the church is 81 ft.; the breadth, 42 ft.; and the height to the ridge, 36 ft. It is intended to accommodate 350 adults and 80 children. The roof is open-timbered. The pews are open, and made of deal stained and varnished. The chapels are separated from the chancel and aisles by open traceried pitch-pine screens, and the latter material is made use of in the construction of the choir stalls and altar rail. A stained-glass window has been introduced into the east end of the church. It has been furnished by Messrs. Clayton & Bell, and is intended as a memorial of the late Mr. Thomas Bairstow. The tower is intended to contain a peal of bells, one of which (the tenor) has already been cast and hung. The entrance porch is placed on the north side of the church, and the heating chamber is constructed under the vestry, the pipes being of the D pattern, and manufactured by the Messrs. Clapham, of Keighley. The windows are enriched with tracery, and the apexes of gables with carving. The pulpit and font, which are executed in Monkton Moor stone, are specimens of what can be done in this limestone (closely resembling Caen stone), and are richly worked and carved. The caps and arcades, and the carving throughout, have been executed by Messrs. Farmer & Brindley, of London. The whole of the work has been carried out from the designs of Mr. W. H. Crossland, of Leeds and London, as architect; and Messrs. John Chambers & Son, of Bishop Monkton, are the contractors. The cost of the church, with boundary walls and gates, &c., is about 4,000*l.*

Kensal New Town (*London*).—A new church, which will be known as the Church of St. Andrew, at Kensal New-town, Upper Westbourne Park, has been consecrated. The new building is situated in the centre of a densely-populated district, of comparatively recent formation, in the extreme west end of London. This district has formed part of the parish of All Saints, Notting Hill; but henceforward it may be looked upon as a district parish in itself. The style is a combination of the Early Gothic and Italian. The aisles are separated from the nave by twelve arches, supported by columns of Devonshire marble and carved stone capitals. The transept is covered by a groined arch, which is carried by mullioned windows and marble pillars of the Ionic order, and the ground is of tesselated pavement. The pulpit, reading-desks, and choir are of stained deal. The building has already cost 8,000*l.* of which 5,000*l.* have been subscribed by a benevolent lady who does not wish her name to be known, and 3,000*l.* from the Bishop of London's Fund. There are 840 sittings in the church, all of which will be free.

Droitwich.—The Church of St. Nicholas has been consecrated. It is built in the Decorated fourteenth-century style, and consists of a nave and south aisle, with provision for a north aisle in future. At the south-west angle there are a tower and entrance to the church. The edifice contains 250 sittings, all free. The seats, which are of deal and open, are stained and varnished. The roof is open, and composed of the same material, varnished. The pulpit is of stone, and is not yet finished as to its carving. The only carvings that are completed are the capitals of the chancel arch, the capitals of the other pillars being left for future carving. The chancel east window is of stained glass, and was presented by Mrs. Miller, of London, who also gave the sum of 500*l.* towards the erection of the church. "The Ascension" is the subject of the east window, and was presented by Mrs. Miller in memory of her late husband, and the four smaller windows, the subjects of which are—"The Nativity," "The Crucifixion," "The Resurrection," and "The Descent of the Holy Ghost," were also presented by Mrs. Miller in remembrance of her own and her husband's

parents. The windows are by Preedy, of London. Mr. John Smith, of Westacre, the architect, who has rendered his services gratuitously, gave the tesselated pavement of the altar, as well as an iron chest for keeping the registers of the church. The altar-rail is of polished oak, with gilt and painted iron standards; the chancel is fitted with stalls, and the prayer-desk and lectern are of polished oak. On the north side of the church there is a small vestry. The tower is designed for a spire, which it is hoped will ere long be erected. The church is heated with hot air, the apparatus having been constructed by Rimington, of Skipton. The burial-ground adjoins the main road, and contains an acre of land; it has been purchased by the parish, and is fenced in with palisades and iron rails. The church is situated on a gentle eminence near the railway station. It is built of stone obtained from Hadley, in the parish of Ombersley. The builders are Messrs. Osborn & Inward, of Malvern. The cost of erection is 1,700*l.*, independently of gifts.

Hastings.—The Church of St. Andrew, Apostle and Martyr, in St. Andrew's-square, has been opened for divine service. The new church is a temporary structure, formed of corrugated iron plates fixed to a timber framework, and lined internally with deal. It has a chancel, organ, and vestry-room, and will seat 550 persons. The open sittings and the whole interior timberwork are stained. On entering the church a stone font, carved, and supported on marble pillars, is seen at the west end of the aisle. The organ (by Holdich, London) is placed on the floor level, in the north-east corner. A Gothic arch separates the nave from the chancel.

Cotehill (near Carlisle).—A new church for the district of Cotehill and Cumwhinton has been consecrated by the Bishop of Carlisle. The edifice, which is called the Church of St. John the Evangelist, is situated at Cotehill, upon an eligible site, presented by Mr. Peascod, of Cumwhinton, and is a light structure in the Early English style of architecture. The building is constructed of the white and red freestone of the district, and comprises a nave 50 ft. by 30 ft., and a chancel 20 ft. square. The east end is ornamented with a tower surmounted by a steeple or lantern, and the chancel is lighted by a lancet window, surmounted by a rose exhibiting some simple tracery. The interior arrangements are of the simplest. Mr. Norman, of Carlisle, who had the slating of the edifice, has contributed to the appearance of the church by an ornamental rendering of the slates not specified in his contract. The church has been erected at a cost of somewhere about 1,250*l.*

SCHOOL-BUILDING NEWS.

Gloucester.—St. Aldate's School has been opened. The main apartment forms a parallelogram over 40 ft. long and more than 18 ft. wide in its interior. There are also a class-room and lavatories. A movable partition,—so framed that, with trestles, tables may be formed on any festive occasion,—divides the room into two schools; and, including the class-room, space is given for about 150 children. The walls are of red brick, with black bands, the heads and sills of the doors and windows of Bath stone. The style is of an Early Geometrical type. The south front has four small lancet and two large three-light windows, with circles in the heads, the latter carried up above the eaves and dormered in the roof. The roof is covered with tiles, and four trefoiled ventilators rise from it. At the north end there is a porch, and the usual offices are under a lean-to roof. Internally, the roof-timbers appear and are varnished; the ceiling is on top of the rafters and collars. The floor is of deal, and at each end there is an ornamental Painswick-stone fireplace. The architect was Mr. J. W. Hugall, of Oxford; the builder, Mr. King, of Gloucester. The site was provided by the taking down of some old houses almost in front of the church.

Stamford.—The Roman Catholics of this town are erecting a school on the site, in Broad-street, where for many years was held the public pig-market, but which was purchased about twelve months since for the purpose to which it is in future to be devoted. The general style of the building will be Gothic, in keeping with the church adjoining. Messrs. Goldie & Child, of London, are the architects of the new school, and its erection is undertaken by Messrs. Halliday & Cave, of Greetham, the builders of the church and presbytery. The works are progressing.

Otterton (near Budleigh Salterton). — Some infant schools have recently been built by Lady Rolle, of Bicton, at Otterton, and contiguous to the parish church of St. Michael. Mr. Ferrey was the architect employed. The designs for a church have also been prepared by the same architect. This building, which is to be commenced immediately, will be entirely new, with the exception of the lower portion of the ancient tower. The church will consist of a nave, chancel, and two compass-roofed aisles, with a north and a south porch. The walls will be constructed of Berrihead stone, the quoins and dressings being of Ham-hill stone. The nave will have an open roof, and the chancel a panelled and ribbed ceiling, both of oak. The internal arcades are to be formed of Caen stone, and the walls ashlared with Beer stone. Devonshire marble cylindrical shafts will carry the moulded nave arcade. The church is to give accommodation to between 700 and 800 persons. The total cost will amount to about 8,000*l.*, which will be defrayed by Lady Rolle. The style employed is the Geometric Decorated. Mr. Burridge, of Exmouth, is the builder of the schools, and will also carry out the church.

FROM AUSTRALIA.

Melbourne.—A new Wesleyan church has lately been erected in Hotham-street, East Melbourne, and was opened for divine service for the first time on 12th September. The building has been erected at a cost of about 650*l.*, with the intention, at some future period, to erect a more commodious church, and use the present building as a school-room.——A new Presbyterian Church has been opened at Pleasant Creek. In style the edifice is Gothic, built on granite foundations, which have been put down to the cemented rock that forms the principal feature of the eminence on which the structure has been raised. In the clear, the building is 67 ft. long, by a breadth of 34 ft., the side walls having an elevation of 24 ft., with the ridge rising to the height of 40 ft. The building is lighted by a double row of windows containing diamond lights, with variously coloured borders; of these there are fourteen on either side, in addition to one stained window, inserted in the apse immediately behind the minister's platform, which is placed in a recess, at the extreme end of the edifice, and which falls back from the main structure a distance of 3 ft. Sitting accommodation has been provided for 350 persons. The material used throughout is Kauri pine (varnished), and bookboards and hat-rails are provided in every instance. In lieu of an ordinary pulpit, is a raised platform for the preacher, 2 ft. 6 in. above the floor level, on the front of which, below the bookboard, are ornamental Gothic panel enrichments in cedar. In front of the reading-desk the choir has been placed at an elevation of 6 in. or 8 in. above the congregation, and the singers are surrounded by a low railing in keeping with other portions of cathedral woodwork. The architect was Mr. R. A. Love.——It is reported that a process for etching on metals by the medium of photography has been discovered by a Melbourne photographer. The matter, however, is kept as secret as possible, with a view of securing patents simultaneously in Europe and America. It is believed that the discovery, if it is what it is represented as being, will cause a revolution in the engraver's art.

Adelaide.—The foundation-stone of St. Peter's Cathedral, at North Adelaide, was laid on the 29th of June last. The ground upon which the cathedral is to be erected occupies a very prominent place at the intersection of Pennington-terrace west with the City Bridge-road. It includes a trifle in excess of an acre, and has been inclosed on one side by a stone wall, with brick facings and copings. The building itself is to face the angles, standing north-west and south-east, and the probable cost when completed will be from 20,000*l.* to 25,000*l.* The design is by Mr. Butterfield, of England, but it has been somewhat modified by Mr. Woods, of the firm of Wright, Woods, & Hamilton, to whom the superintendence of the work has been entrusted. The principal alterations made consist in heightening the tower, putting in windows, and so forth. The style of the edifice is described as Transition and Decorated, presenting a general resemblance to the Gothic. The total length internally will be 168 ft., by a total width of 58 ft., and a height of 70 ft. to the ridge. The centre is divided by transepts into nave, choir, and chancel. The nave, which is for the congregation, is divided by two rows of columns or piers, the space between from centre to centre being 32 ft. From these will rise lines of arches to the roof, which will be open, with Baltic timber stained and varnished. In the choir, there will be benches fitted up for the singers, and in the side aisles of the chancel will be the usual cathedral canon-stalls. The first transept projects very slightly on either side. Beyond the choir is to be a secondary transept separating the chancel from the choir, one end of which is intended for an organ-chamber. The chancel will have two ornamental tracery windows, which will probably eventually, if not at once, be fitted with stained glass, and it will also be lighted by windows at the side, as well as at either end of each of the transepts. The front consists of two towers with buttresses, decorated windows, and minarets, spires to be executed in cut stone, banded, to rise from the centre to a height of 140 ft. Each tower will be divided into belfry and ringing chamber, besides which there will be an entrance through it to the interior of the cathedral. The main entrance is between the towers by a deeply-recessed arched doorway through a narthex, or porch, and above it will be a large ornamental window. The sides of the building are to be supported by buttresses of cut stone, between which will be small complex lights in the nave; and in the clearstory or upper part there will also be two-light tracery windows in each bay. Above the smaller transept will be a lantern springing from the centre to the height of about 110 ft. The whole of the dressings, internal and external, are to be of freestone, and effect will be produced by the use of white and brown stones in bands. The other portion of the building will be of Glen Osmond stone, and the roof of slate, which is also to be used for the floor of the interior. The building, when completed, is expected to accommodate 1,000 or 1,200 persons. The nave is to be furnished with chairs, not benches. It is thought probable that at some future time a peal of bells will be placed in the tower. No contract has as yet been taken for any part of the building; but it is expected that the work will be prosecuted without further delay. The cost of the portion to be first erected is estimated at some 12,000*l.* or 13,000*l.*

Australian Diamonds.—According to recent accounts, an extensive area of ground has been taken up for diamond mining on the Cudgegong River, New South Wales, the only locality in that colony where diamond mining has as yet been prosecuted on a large scale. The Australian Diamond Company have provided themselves with a steam-engine for working their gem machinery. Fresh discoveries are continually reported. Diamonds have been found along the greater extent of the Reedy Creek, at Eldorado, Sebastopol, Woolshed, and higher up at Wooragee. A gem found in the Epsom district was recently forwarded to Mr. Crisp, of Melbourne, who pronounced it to be a diamond: this is the first Bendigo diamond that has been heard of. A Lyttleton (New Zealand) journal states that a miner has brought a number of coloured crystals into Christchurch, and on inspection one stone, about half the size of a pea, was found to be a diamond.

Books Received.

The Conservation of Pictures. By MANFRED HOLYOAKE. London: Dalton & Lucy. 1870.

THE objects Mr. Holyoake has in view in this little work are to urge the importance of preserving fine pictures that remain to us, and to show that the conservation of pictures (not to say restoration) is practicable and indeed necessary. It is a protest in fact, with reservations, against the belief induced by abuses that the so-called picture-restorer is to be uniformly avoided. The observations are very sensible, marked by a right reverence for great artists own work, and calculated to have a good effect.

Pro Aris et Focis. By FANNY AIKIN-KORTRIGHT. Printed for private circulation by Yates & Alexander, Symond's Inn.

THE author of this eloquent appeal to women against the teachings of the strong-minded of their sex is better known as "The Dean," or the author of "The Dean," than by her own name. She is herself strong-minded nevertheless, though womanly still. Her arguments will powerfully influence those of her sex who are not "strong-minded," though some of these

arguments will be easily demolished by her opponents. Much may be said on both sides of the question; which goes to show that neither *extreme* can be right,—more especially the "strong-minded" extreme. That woman's mental nature differs from man's, there can be no rational doubt. It is more spiritual and less self-asserting,—more intuitive and less reasoning,—more ideal and less matter-of-fact,—more radiative or less concentrative than man's. It is, therefore, adapted, and hence intended, for a different sphere from man's. His is the mind and the nature best adapted for external life, as it were; for facing the rough usage of outward nature, and the strife requisite to "make way in the world." Hers are the mind and the nature best adapted for internal life, for domestic duties. She is the type of the ministering spirit of counsel and comfort to the man, and hence of the angel, even if she be a devil, since the devil was an angel. For woman to set herself up as a rival to man, therefore, must be radically wrong. But if "the times are out of joint" as regards woman's mission as man's counsellor and comforter,—if there be too little "marrying and giving in marriage," what is she to do? She is compelled by ungallant man to provide for herself, to walk out into the external life and strive as man himself does for a livelihood. The cause of the movement is a deep-seated one, therefore; and until that cause, or those causes, whatever they be, which hinder and obstruct the universal law of marriage among mankind, be removed, the higher their civilisation, the more potent will the movement of the strong-minded women on their own behalf become.

Still there is a great deal of truth and force in "The Dean's" arguments, and we can only hope that their ultimate tendency may be to turn the attention of her sex upon their own shortcomings, as regards their modes of attracting the permanent regards of the man; for, doubtless, those shortcomings exist among women no less than among men; and especially in the early teachings and the general "bringing up" of girlhood. Is she properly taught to fulfil her manifest destiny? Does woman, who is also the man's early teacher, rightly fulfil even that duty as regards the end in view? The influence of early training, both on boys and girls, is all-powerful to any social end; and much might be done even in a single generation to restore that balance which is evidently lost. A despicable money worship on both sides has much to do with the present state of affairs between the sexes. So has the neglect of useful accomplishments on the part of the woman, and the desire to make her as frivolous and useless as possible to the man, as a comforter, or even as a counsellor.

Principles and Construction of Machinery: a Practical Treatise for Students, Engineers, and Practical Mechanics. By FRANCIS CAMPIN, C.E. London: Atchley & Co., Great Russell-street.

A PAST president of the Civil and Mechanical Engineers' Society, as Mr. Campin is, cannot but be a fitting and competent writer on the principles and construction of machinery. Mr. Campin here treats of the laws of the transmission of power, and of the strength and proportions of the various elements of prime movers, mill work, and machinery generally. The work is the substance of a carefully revised digest of the author's oral instructions as a teacher in training pupils. He has aimed at setting forth fully the laws of construction in reference to strength of parts, while stripping the subject of much cumbrous matter with which it has heretofore been loaded. He teaches not only why a given machine produces a certain effect, but also how practically to make it.

No Rebuilding Lanes in the City. By WILLIAM F. ROCK. London: Effingham Wilson.

THIS is an appeal against the threatened rebuilding of Bucklersbury, and the covering of the rest of the triangular plot now cleared next the Mansion House. The feeling is strong in favour of preserving this open space. At any rate, Charlotte-row must be greatly widened, and Bucklersbury must be greatly widened, which would make the plot very small, and we do hope the Metropolitan Board of Works, and the Corporation together, will see what can be done in order to keep the whole plot open. We shall not be amongst those who will abuse the Board of Works if, after all, they should utilise part of it. The value of the whole is called 190,000*l.*, and the Board are forced to consider the ways and means. But we shall be amongst the heartiest applauders if they screw up courage to do the right thing. They will find hereafter that it is to such an act as this would be that people by and by will appeal when they are estimating the value or otherwise of the Board.

Miscellanea.

The Public Health in 1869.—Under the title of "The Weather and the Public Health in 1869," an elaborate paper has been issued by Mr. Plant. From this paper we extract a few statistical details. The population of Manchester in 18 years—1851-69—with a high death-rate, increased at the rate of only ¼ per cent. per annum; whereas the population of Liverpool, with a still higher mortality, advanced in the same period 2 per cent. per annum. The towns which have increased the most in population are Sheffield and Birmingham; the former, in the 18 years, at the rate of 3½, and the latter 2¾ per cent. per annum. Sheffield, however, with 10·5 inhabitants per acre, has a prevailing high death-rate, and Birmingham, with 46·1 persons per acre, enjoys the lowest mortality of all the large towns. The towns which have increased the least in population are Bristol and Manchester; the former, with a uniform low death-rate, and 36·1 inhabitants to each acre of ground, and the latter, with a high mortality, and 82·7 persons per acre. Taking the five sea-ports in England, we find that during the last 18 years population has increased as follows:—London, 2 per cent. per annum; Liverpool, 2 per cent.; Hull, 2¾ per cent.; Newcastle-on-Tyne, 2½ per cent.; and Bristol, 1¼ per cent. per annum. Liverpool is the unhealthiest, and London and Bristol the most salubrious of all these ports. Birmingham still ranks the highest for health:—

"If the authorities of this town would examine the sanitary condition of certain districts, the borough of Birmingham might be made even more healthy. There is a high death-rate, from zymotic and other causes, in St. George's, St. Mary's, and other districts. This excessive mortality goes on year after year, and the sanitary officers do not appear in the least concerned. The larger number of deaths are blended with the smaller of the more salubrious localities of Edgbaston, &c., and few persons are the wiser, because the general result appears satisfactory. It is a deception, and the sooner the real facts are revealed, and the health of Birmingham proper is published, the better for our sanitary guidance."

Progress of the New City and County Lunatic Asylum, Hereford.—The architect of this edifice reports "satisfactory progress. With the exception of the superintendent's house, the whole of the foundations are in, and the walls plinth high. The administration block is nearly covered in; the dining-hall and chapel ready for the roof. The men's workshop block is covered in, and great portions of men's No. 1 ward also. The brewhouse building is roof high, and men's infirmary building nearly so." The desirability is suggested of heating by steam or hot water the single rooms of the males' and females' infirmaries, in addition to the open fireplaces therein. The architect has directed the contractor to complete the more advanced buildings, the laundry and washhouse, and superintendent's house, as quickly as possible, so that a portion of the building may be in a fit state for reception of patients by August or September next. The visiting justices superintending the erection have recommended the purchase of 110 acres of adjoining land, for cultivation by patients, and for airing-grounds, &c.; and this has been agreed to at the sessions.

Cornish Granite Workers.—A correspondent of the *West Briton* writes:—I regret to hear of many very important contracts for granite being given to the French and other contractors, which, with a little concession on the part of working men, might have been obtained for Cornwall. The consequence is that a large amount of capital is lying idle, and many men are out of employ, the masters' works being comparatively idle. The granite masons formerly had 4s. 6d. a day; they then insisted on having 5s., with the additional privilege of having all their tools sharpened at the expense of their employers. But even this concession was not sufficient, and nothing less than 5s. 6d. a day would satisfy some of the men. The masters found this far beyond even what would give them a new shilling for an old one, and consequently decline to take orders which would involve them in a loss instead of a profit.

Lecture to Jewish Workmen on Houses and their Ornaments.—On the 9th instant a lecture was delivered by Mr. Ellis A. Davidson on this subject at the Jews' Infant School, Spitalfields. The audience were mostly working people and their families. The lecturer depicted the first habitation of man from the time of his banishment from Eden, which habitation, he said, was afforded by a tree, with a few skins of animals for cover. He next proceeded to show one or two uncivilised dwellings, one of which was designated the "Human Nest." The foundation of this was a straight pole stuck in the ground, with a few skins of animals for a roof, at the top of which the children slept while the parents were out hunting. The lecturer exhibited a model cottage, the usefulness of which was explained by showing that the projecting points of the roof were not so much wanted for rain or bad weather as for protection from heat; so that the more it projected the more we got the shade. He went on to show the real principles of arch-building, and where the strength lay. Having given a rapid sketch of the history of building, the lecturer proceeded to describe a few ornaments, commencing with the Egyptians, as the most ancient. The lecture was instructively illustrated.

Maddening Drink.—Not long since we pointed attention to the sad and serious fact that of late years the infuriating effects of drink, and the dreadful crimes resulting from it, were greatly on the increase,—a fact which could only be attributed to the adulteration of the drink by poisonous agencies, producing effects simulative of intoxication, but really of a different and far worse character. We observe that a Liverpool brewer, a Poor-law guardian, not only corroborates this, but states that in lately visiting the pauper lunatic asylums in Lancashire, and asking as to the causes of the increase of lunacy in such asylums, he was told that drink was the chief cause of the madness of paupers. Yes, and drink is the chief cause of pauperism itself. The guardian urged the appointment of inspectors of drinks, such as those of food. "There was a law," as he observed, "which, if put in force, punished people for using poisonous ingredients in the making of beer,—preventing them from using *grains of paradise, nux vomica, oil of vitriol, ammonia,* and other things *that were used in making beer,* in addition to malt and hops." So said the brewer. Another guardian remarked on this, that after such an *exposé* of the secrets of the beer trade, anybody who drinks it must be mad already.

Christmas Lectures at the Royal Institution.—A series of six lectures adapted to a juvenile auditory has as usual been given at the Royal Institution. This time Professor Tyndall chose "Light" for his subject. "Faraday and Newton himself," says *Scientific Opinion*, in reporting the lectures, "would have been delighted had they witnessed the brilliancy of colours produced by a transparent film, such as was shown in one of the lectures. We are referring to the enormous soap-bubble (or rather a bubble made by means of glycerine and oleate of soda), on which the lecturer himself had experimented but the day previous for the first time. This bubble, when in contact with a beam of monochromatic light, produced effects not unlike the fiery flashes of an Aurora borealis at times; while at other moments the softest hues of spectral colours were thrown on the screen." His experiments with the invisible rays of heat alone, obtained by intercepting the luminous rays, were remarkable, though not new. During one of the lectures he produced a little stove, a kind of miniature kitchen-range, with a fire all properly laid, according to the established craft of our housemaids, but of course not lighted. He brought it near that dark, pitch-dark focus, and behold, it was lighted, as if by magic!

I.H.S.—A church in Hampshire, which has been restored, has very recently been re-opened. An altar-cloth was given by a lady well known for the specimens she has worked for numerous churches on such occasions. The letters "I. H. S." were, as is usual, very prominently worked on the sacred vestment. The initials of a parishioner, whose family restored the chancel, happen also to be I. H. S. On the day the church was re-opened, says the *Bristol Times*, a person from the neighbouring parish, at first sight of the altar-cloth, exclaimed to a friend,—"Oh! I know who gave that. It must be Mr. John Henry S——. It is very good of him to contribute in more ways than one."

The Little Girl who made San Francisco Populous and Famous.—Captain Sutter, an ex-officer of Charles X.'s Swiss Guards, who had been forced to emigrate in 1830, had settled in California and founded a little colony, which he called "New Helvetia." In the year 1847 he entered into a contract with a Mr. Marshall to have a saw-mill built for him on a branch of the Sacramento river. During the progress of the work, a little girl, the millwright's daughter, picked up a shining yellow lump under the mill-race, and showed it to her father as a pretty stone. Marshall brought it to Captain Sutter, who at once recognised the precious metal, made careful investigations, and soon found that the whole country watered by the Sacramento river and its numerous tributaries abounded in gold. San Francisco was then a wretched village, containing some 400 inhabitants; in a few years the population rose to 40,000; and it is now a magnificent city, the capital of the western world, the terminus of the longest line of railway ever planned or executed, and the rival of New York in the great contest of cities for the seat of the government of America. And all this has been brought about in twenty years by a few tons of gold!

A New (?) Application of Water Power. "H. J. W.," in the *Pall Mall Gazette*, notes the discovery of a new store of force for modern engineers:—"It certainly seems strange enough to speak of the power of falling water as a new force, but though water has been at work turning mills since, probably, the time of Moses, if not before, this seems to be the first time that it has been used in works of such magnitude as the Mont Cenis tunnel. If the aspirations of the French engineers are carried out, Switzerland, as being the most mountainous country in Europe, is likely to cut us out entirely. Her waterfalls will render our coalmines useless. However, we have Wales and the Highlands to fall back on, to say nothing of all the lake district: Stock Gill Force may come to merit its name in more senses than one. It may also be some consolation to us to consider that waterfalls are not usually in the most accessible parts of the world. The coalmines are *in esse*, and the waterfalls, as motive powers, only *in posse*; so our manufacturers need not yet hurry themselves to migrate to Switzerland or the banks of Niagara."

"The Churches of Lindisfarne."—A volume under this title is announced to be published by subscription, containing plans and views of the seventy-six churches in the districts of Glendale, Coquetdale, Reedsdale, Bamburgh, Morpeth, North Durham, Holy Island, Berwick-on-Tweed, Tweedmouth, and Alnwick; the whole comprising, illustrating, and contrasting the fabrics in the archdeaconry of Lindisfarne; made from actual surveys, by F. R. Wilson, architect. It is said this survey will be found full of historical, archæological, and parochial interest; and it is also novel, as most of the churches in it have not been illustrated or described before. The author has been collecting the materials for the last ten years, with a great expenditure of labour, time, and money, in order to make the work complete. Battered as some of the fabrics have been by the Scots and freebooters, they all possess features of great interest.

Panic in a Theatre.—In the American Theatre, Walnut-street, above Eighth, Philadelphia, while crowded with people, a cry of fire was raised. The alarm was occasioned by the breaking off or derangement of one of the brackets on the east side of the theatre under the gallery, which caused the gas to pour out in a large volume, and this, communicating with one of the lights, soon took fire. The flame was about as large as a man's arm, and when observed by the dense mass of people, the excitement can be more readily imagined than described. At length a gentleman came forward, accompanied by a number of the *attachés* of the house, with buckets, fire-hose, &c., and after some twenty minutes had elapsed, succeeded in assuring the people that there was not the slightest danger, as the accident had been repaired. This had the desired effect, and the performance was proceeded with.

A New Light.—A new artificial light, specially applicable to photography, has been tried, it is said, with much success. It is produced by rendering cylinders, composed of magnesia and titanic acid, incandescent by the oxyhydrogen flame.

Accidents.—The roof and part of the walls of extensive dye-works, in Titchborne-row, Edgware-road, Paddington, have fallen in. The large number of workpeople employed on the premises had not begun their day's operations. It is supposed that there must have been some defect in the joists.——Three persons have met with their death at Penniford, in North Devon, by the falling of a chimney. A house near the chimney was in a dilapidated state, and in consequence of the chimney falling the premises were entirely demolished, the three inmates being buried in the ruins; others escaped. The chimney which fell was a stone one.——In a circus at Dunkerque, in the north of France, the public were leaving after the performance, when a part of the flooring gave way, and precipitated 150 persons to the ground beneath. Many received contusions more or less serious, but no lives were lost.

The Folkestone Bathing Establishment. The result of the working of the Bathing Establishment at Folkestone has realised the anticipations of its promoters. The report of the directors for the first half-year of the existence of the establishment shows that "notwithstanding the drawbacks of a short unfavourable season, and the disadvantages necessarily flowing from many details in the arrangements being in an incomplete state at the opening, and which required much time to make perfect," the balance-sheet to November 30th shows a net profit enabling the directors to pay a dividend of 5 per cent. per annum on the paid-up capital, and carry forward a balance of nearly 200*l.* to the next half-year's account.

New Process of Photo-Lithography.—Mr. Francis, of the Athenæum Press, having secured the invention from Mr. Griggs, has introduced an entirely new method of producing copies of prints and pictures to the publishing world. The combination of photography with lithography was first attained by Sir Henry James, of the Topographical Department, but the process of Mr. Griggs claims to be a considerable advance on the original invention. Mr. Griggs takes a photograph of a print or picture in the ordinary way, but upon paper prepared in a manner only known to himself. The photograph thus taken is laid upon the stone and transferred, as in simple lithography, when it produces copies of the original picture with accuracy and clearness.

The Finsbury Estate.—"Corporator," in the *City Press*, says:—"The possession of the Finsbury estate by the corporation dates from the year 1553. The lease was renewed from time to time. In 1769 an Act was passed by Parliament, enabling the prebendary of Finsbury and his successors to grant a ninety-nine years' lease to the City, commencing from the year 1768, to be subsequently renewable every fourteen years. In 1769 Dr. Wilson, the then prebendary of St. Paul's, procured the passing of a private Act, apparently with the view of furthering the matter, but differing from the former one in having no renewal clause inserted. The result has been that the corporation has now no interest in this valuable property.

A Greek Church in Liverpool.—On Sunday, the ceremony of consecrating the new Greek Church of St. Nicholas, at Liverpool, was performed by the Archbishop of Syra and Tenos, assisted by several priests from London, Manchester, and Liverpool. The new church, which is situated on the Prince's Park-road, is built of ornamental brick, and is surmounted by four domes. The interior is divided into three sections—a large vestibule, the body of the church, which is intended to accommodate 600 worshippers, and the sanctuary, which is separated from the body by an elaborate screen. We are compelled to defer a description of the building. The authorship of it is in dispute.

Ball for the Builders' Benevolent Institution.—We desire to draw attention to the circumstance that this annual festival in aid of a deserving charity will take place at Willis's Rooms, on Thursday next, the 27th. We have made this notification under similar circumstances many and many a time before. Whether or not it has effect; whether or not it leads any of our readers to aid the Institution; whether or not the committee think the act obliging, we do not know. Anyhow, we fulfil what we consider a right prompting, and must leave the result to chance. The Institution needs funds.

Explosion at Westminster Bridge.—On the Surrey side of Westminster Bridge a loud explosion occurred the other evening in the gas-meter house, a small cell formed in the abutment of the bridge, on the Surrey side, access to which is obtained by the steps immediately in front of the Coronet public-house. The explosion forced out the doors of the meter-house. A number of the lights on the bridge were extinguished. The meter itself was uninjured. The accident was mainly caused by a defective cock, which had been temporarily plugged with a piece of wood. When the gas was turned on to light the bridge, the plug was inadvertently withdrawn, thus allowing the gas to escape and accumulate in the house. The explosion occurred when the lamp adjacent to the house was being lighted.

Iron Church and School, Cymmau.—A galvanized corrugated iron building to be used on Sundays as a church, and on week-days as a school, has just been completed on the side of Hope Mountain. It is capable of seating about 200 persons, and is lighted by six windows on the sides, and a large window similarly at each end. The entrance is on the south side through a porch. This, in a mountainous district, with very bad roads, prevented the greater part of the children from attending school; therefore, we may presume the building will be a boon to the inhabitants. Mr. S. Sothern, of Wrexham, was the designer and contractor.

Chemistry of Smoke.—Mr. W. R. Hutton, of Glasgow, proposes that coal, before being consumed in ordinary furnaces, stoves, or fireplaces, should be distilled in close vessels. The heat should be continued not long enough to produce the ordinary dense coke—which can only with difficulty be burned—but to form a soft coke, which can be consumed as readily as common coal, but without black smoke. According to Mr. Hutton's calculations, 1,000 tons of coal will yield as much gas and soft coke as would be sufficient to realise a profit of 71*l.*, of which a large proportion would be derivable from the sale of the oil and the ammonia as a manure.

The Independent Society of Engineers, Manchester.—The members of the Independent Society of Engineers, which has recently been formed in Manchester, have inaugurated the formation of the society by a dinner, which took place at the Clarendon Hotel. The objects of the association are to afford assistance to those of its members who may happen to be out of employment, or who may be incapacitated from work by sickness. At present the society numbers forty members. The society has no connexion with any trade-union.

Stone from the Jura.—Our attention has been directed to some specimens of magnesian limestone, exhibited at the Institute of Architects, by M. Paul de Tinseau, proprietor of the quarries at St. Ylie, Jura, France. The stone is described as very hard, and capable of receiving a fine polish, which renders it suitable for the shafts of columns, staircase balusters, mantelpieces, and other decorative details, as well as for ordinary construction of a superior character. The cost of stone delivered in London would be about 3*s.* per cubic foot.

Castings.—We have an account of a new method of making castings. The mould is made of fine potter's clay, giving great smoothness of surface. The metal is then injected from below by means of a piston working in a cylinder, and as some pressure is applied, every part of the mould is reached by molten metal in a state of compression, so that the casting is as smooth as if worked by hand. Messrs. Smith, of Philadelphia, who have made castings in this way, claim to be able to produce screws at the same expense as that formerly incurred in merely manufacturing the wire.

The Church of All Saints, Dresden.—This church, which has been erected to the memory of the late Mr. W. H. Goschen, was consecrated, on the 27th of November, by the Bishop of British Columbia, acting under a commission from the Bishop of London. Illustrations of the building will be found in our last volume.* The site has been given by the town council of Dresden, in one of the best parts of the town. The whole of the windows, except those in the clear-story, have been filled with painted glass by Hardman, of Birmingham, and Preedy, of London. The organ is by Walker, of London.

* Pp. 666, 667.

The Builder.

VOL. XXVIII.—No. 1408.

Grand Cairo.

THERE are two cities which, from their peculiarity of position and the unusual character of their surroundings, strongly impress the mind of the traveller who sees them for the first time; and where the feeling aroused by the sight of them is not merely admiration of their extreme beauty, but the perception of a quality that they possess which is akin to the sublime. One of these is Venice, the sea-born, sea-girt Venus, as an old writer terms her, springing from the ocean bed, surmounted by the conch of St. Mark's, and graced by multitudes of cupolas and towers. The other is the queen city of the desert, Cairo, also rising in grandeur from a long level line, that of the sandy plain, and also crowned with innumerable domes and minarets. Both are surrounded, or nearly so, by a vast and apparently boundless expanse—Venice by that of the waters of the Adriatic, which if pursued to their utmost limits would lead to the shores of Africa and the Pillars of Hercules; Cairo by that of the sandy desert, which if followed out would lead past the kingdom of Theodoros, through the domain of Livingstone, to the territory of the Bosjesmans and Boers. In both cases this expanse is trackless, except where, in the one case the wrecks of vessels, and in the other the white ribs of the foundered ships of the desert, point out the road; in both cases it is silent, for the velvety footfall of the camel makes no more noise than the oar of the gondolier. And both have the claim of age, for both were founded above a thousand years ago. Thus each has these elements of the sublime in its position—vastness, silence, repose, and hoar antiquity. But in this quality of sublimity, and even in that of beauty, the City of the Sea must yield the palm to the City of the Desert, for when looking at her domes athwart the lagoons, one does not see, as at Cairo, the summit of the eternal Pyramids looming in the distance, nor do the cupolas of St. Mark's, and the Salute, and the tower of the Campanile equal in loftiness or in elegance the domes of the Mosque of Sultan Hassan and other tombs of the Kalifs and the two hundred and fifty minarets attached to the other mosques and sepulchres. We defy any traveller, however much he may have seen of Eastern cities, not to be impressed with the aspect of Cairo when he beholds it for the first time, whether he sees it from the railways of Alexandria or Suez, or whether he looks down upon it from the ramparts of the Citadel of Saladin.

It was our good fortune to behold it for the first time from the latter spot, for it was evening when we reached Cairo, and we sought rest and refreshment in a comfortable hotel in the Esbekiah, a large square in the outskirts of the city, planted with trees, and surrounded by the principal hotels and other houses of the Franks. The next morning we drove to the citadel, through the only street practicable for carriages, preceded by a runner, who shouted warnings to the veiled women and turbaned men who thronged the bazaars. How we reached our destination without overturning man, woman, or child, in this crowded street, is to us a wonder to this day. Having ascended to the citadel, which is situated on the spur of a hill, we looked down upon the splendid panorama beneath us. Immediately under the walls was a vast piazza, bounded by low, flat-roofed houses, from amongst which rose at one side of the square a majestic mass of masonry, surmounted by a dome, and relieved by two lofty minarets of unequal height. The whole square was filled with rejoicing Orientals, in their many-coloured garments; every shade of every colour was to be found among them; and as they swayed to and fro, they resembled, more than anything else, a bed of tulips agitated by the breeze. It was the occasion of the fête of Sultan Hassan, and all Cairo was assembled in the vicinity of his mosque,—the fortress-like building that adjoined the square,—which was that of Roumeli. Beyond the piazza was an interminable series of small white squares—the flat roofs of houses—intersected by dark lines of shade, which marked the courses of the tortuous *sooks* or alleys, for few of them deserve the name of streets. Here and there were roofs of a domical form, those of the *hammams*, schools, and other public buildings; and the whole was relieved by the elegant outlines of stilted domes and by the graceful minarets, which caught the sun's rays, and reflected them from every face of their honeycombed corbellings; and from their pierced and traceried balconies beyond this glittering mass, there appeared to be a vast lake,—for it was the period of the inundation,—in the midst of which the course of the Nile could be here and there traced by the palm-trees on its banks; while through the mist, caused by evaporation, were to be seen the dim outlines of the Pyramids. Such a view as this is seldom forgotten. Everything we saw was Oriental in character. At Constantinople, Italian palaces and hybrid Gothic churches break the spell, and recall us to the plots and intrigues of Frankistan; but here the Frank quarter is so distant that we saw no formal rows of modern houses, nor black-coated gentry riding on donkeys, to remind us of the grooves and trammels of European civilisation.

Whilst in the citadel we visited the mosque and tomb of Mehemet Ali. We were, however, disappointed with this specimen of modern Egyptian architecture. The plan is good, being that of a square with a semicircular apse on each side, and the materials of which it was constructed were of the richest, the columns being of marble, and taken from ancient buildings, and the walls, to a certain height, being lined with darkly-veined Oriental alabaster; but the details are rococo, the colouring is tawdry, and the general effect that of coldness and dreariness, which one perceives in the modern mosques of Stamboul. The rich carpets and pendent lamps alone relieved it. Had the founder been content to take for his model one of the numerous mosques that lay in the city under his eye, he would have left behind him a work that would have been the admiration of posterity; but it seems that it is not in England alone that full appreciation of truth and beauty has passed away.

The mosque of Sultan Hassan, to which we, ascending from the citadel, elbowed our way, through a crowd occupied in watching rows of felt-capped dervishes swaying from side to side in measured time; past the stalls of vendors of sweetmeats, and immense swings in which bearded Moslems, who in their amusements are but children, were taking great delight,—offers a fine contrast to that of Mehemet Ali.

We emerged from the crowded place into a narrow street, in which was situated the entrance to the mosque, and here we gazed up at its walls, which are 120 ft. high, built of alternate courses of dark and light coloured stone and marble, and finished by a rich corbelled cornice of great projection. This mode of building in parti-coloured courses, which is common to all the Cairene buildings, and indeed prevails generally throughout the East, gives scale to a building, and at the same time a satisfactory appearance of solidity. The doorway is situated in an arched recess, 100 ft. high, reminding one of the three western arches of Peterborough Cathedral. It is reached by a flight of twenty or thirty steps. On entering, we found ourselves in a small chamber, in which were stationed the guardians of the mosque, who directed us to take off our shoes, and enveloped the shoes of a lady who accompanied us in pocket-handkerchiefs, as she very naturally objected to walk shoeless on the cold marble pavement; we then passed through a low winding passage and entered the body of the mosque, which may be described as a cube of about 115 ft., with the top off; that is to say, it was open to the sky. In each face of the cube was a vast pointed arch, about 60 ft. in span, opening into a square or oblong recess: one of these recesses was larger than the rest, and had two doors in the inner wall, which led to another square hall, the tomb of the Sultan. In the centre of the court was a large domed fountain for ablution.

The effect of the whole was that of simple grandeur, arising from the vast dimensions of the arches. Passing a row of turbanned worshippers who were going through their prostrations, under the guidance of a *Mollah*, with as much regularity as soldiers follow their fugleman, and who did not seem to regard the presence of a female in their holy place as a pollution, we followed our dragoman into the inner hall or tomb. This was a square of about 60 ft., lighted by windows at the sides, and covered by a lofty dome. The painting and gilding were faded, the ornaments crumbling to dust, and the whole had a dilapidated look, though it will be ages before the building itself can become an actual ruin, as the walls are generally 13 ft., and in some places 25 ft., thick. The windows which light the tomb are two-light, with circular apertures above them. They are set in trefoliated recesses. There is resemblance in these and in the windows of most of the mosques of Cairo to Gothic of the Plate Tracery period, which has become so much the fashion in England; and there is indeed much to be learnt from these fine specimens of Saracenic architecture by an architect whose mind has not been narrowed by exclusive study of one particular school. This mosque was built in the fourteenth century, and is of the later style, resembling the Byzantine. It was probably built by Sultan Hassan, during his lifetime, and was destined, like that of Mehemet Ali, for his tomb. In most cases the tomb of the founder adjoins the mosque, and has a dome. The mosque proper in Cairo has no dome, but a flat roof. Such is that of Toloom, which we subsequently visited. It consists of a large quadrangular court with arcades round it. On one side the arcade is five bays in depth, and separated from the court by a wall, thus forming a building similar to a basilica. This is the primitive type of mosque. When the impostor Mahomet built his first house of prayer at Medina, no doubt he took for his model the Caaba where his fathers worshipped, and after he had purified the latter spot and overthrown its idols, no doubt it became the mother of all mosques, especially as he taught that it was founded by Adam after the image of the house of prayer in the heavens, which he said was situated immediately above it. The plan was simple in the extreme;—a square enclosure, with

arcades all round, and a small building in the form of a cube in the centre. Subsequently when the *Successors* took possession of Damascus and Jerusalem, they found models for their mosques in the Church of Constantine and the Basilica of St. John. Accordingly we find that all the larger and earlier mosques in Cairo are upon the Basilican plan, and that it is only those that were erected after conquest of the whole of Asia Minor had familiarised the Moslems with the Byzantine churches, after they had seen the greater advantage of the cruciform plan, and the convenience and beauty of the dome, which they thenceforth adopted as the characteristic feature of their architecture, that were after the Byzantine fashion. But the inhabitants of Cairo never took kindly to the Byzantine plan. With the exception of the mosques of Sultan Hassan and El Ghoree, and a few others of the sixteenth century, which are on the cruciform plan, all the principal mosques, such as Toloom, El Azhir, and El Hakem, are built upon the primitive plan.

The Mosque of El Azhir is a Mahometan university; its spacious court, which is 250 ft. square, is divided into seventeen schools for the instruction of Moslems from Arabia, Morocco, Turkey, Nubia, and elsewhere. At one end of the court is the mosque, which has eight ranges of columns, numbering, with those of the quadrangle, 350, most of them with ancient capitals and bases. The gate has two trefoliated arches, exactly like thirteenth-century Gothic. We attempted to get into this mosque, but were repulsed by the fanatical gatekeepers.

But it is not in Cairo itself that Saracenic architecture is to be seen in its perfection: outside the gates and at the sides of the citadel are two extensive cemeteries, and in the midst of these are to be seen, a mile or two from the city, groups of domed tombs, with mosques adjoining them, and minarets of the most picturesque forms imaginable. These are commonly known by the names of the Tombs of the Kalifs and Mamelukes; and many of them bear the names of their founder, such as the Mosque of Kait Bey, and that of Imam Chafei. Those on the north side of the citadel are the most numerous. They consist of eight or ten domes, supported by square basements canted off at the angles. These domes are all pointed, stilted, and bulbous in form; that is to say, they are narrower at the springing than a little above it, and they are all, more or less, decorated externally with ribs, lozenges, or arabesque patterns cut in the surface of the stonework. The minarets are also of various forms, but most of them resemble those in the city, being some square below and octagonal above, with three or four corbelled galleries. On the upper stage there are small columns at the angles, and their summits have the termination like a pear with its stalk upwards. In the narrow streets of Cairo one has almost to break one's neck in order to get a sketch of the domes and minarets, but here they can be seen to the greatest advantage, and sketched without molestation.

Besides the mosques there are numerous buildings of interest in Cairo, such as the baths and bazaars; but as there are no architectural peculiarities about them,—the former consisting of a series of square chambers, lighted by bull's-eyes in the domes, and supplied with hot water and steam *ad libitum*, and the other being merely arched or covered passages,—we need not waste time in describing them. If the traveller should, after a few days, tire of Cairo and its old-world ways, and should wish to be refreshed by a glimpse at green foliage and an image of civilisation, let him make an excursion to the gardens of the Khédiveh, at Schoobra. A pleasant drive of three or four miles through a magnificent avenue of over-arching sycamores and acacias will bring him to the gates of the palace of Schoobra. This he will not care to visit; but in the garden he will find a collection of all the flowering and other shrubs of Egypt, and in the centre of all he will see a kiosk. If he be an optimist who believes in the civilisation of the Mahometans, he will be gratified to see the interior fitted up like a Parisian boudoir, and handsomely bound editions of great writers upon the table. If, however, he be accustomed to Eastern ways, he will only perceive in this a sign of that Oriental politeness which aims at pleasing the eyes of visitors, and will not be a whit the more convinced that civilisation is compatible with a belief in the Koran.

There are many other interesting excursions to be made in and around Cairo. Boulak, the island of Rhoda, and other spots, may be visited without difficulty by any one who will trust himself to the guidance of a member of that institution of Egypt, the donkey-boys, and who will be content with the smooth paces of Ginger Pop, Yankee Doodle, or Lord Dundreary. He will not learn much from his guide, but will be amused by his stereotyped English phrases, and will be able to amuse himself by observing the manners and customs of the Arabs, which he could hardly do if seized upon and lionised by an enterprising dragoman.

But if he should venture on an excursion to the Pyramids on donkey-back, as we did on gentle Ginger Pop, we counsel him not to go without the escort of that necessary evil, the dragoman, or he will be almost torn to pieces by the Pyramid Arabs, who never can be brought to believe that they have had *backsheesh* enough: beginning with politeness, they end with menace; and if they get a solitary traveller inside the King's Chamber, are not likely to let him get out without paying a king's ransom.

GLEANINGS IN GLASTONBURY.*

THE wall arcades both within and without the Chapel of St. Joseph are designed with exquisite taste on a par with the beauty of their execution. Each shaftlet, no doubt a Purbeck monolith, was set upon a curved channel sunk in the wall behind. "The artifice," says Willis, "gives a lightness of effect, by providing a free space between the shaft and the wall, and at the same time enables the shaft to be set nearer to the wall." It is closeness and compactness, we would say, rather than lightness, that is aimed at and effected. The shafts carry round arch mouldings, which do not interlace, but rather interfere, their plain faces being continuous on the same plane, and confluent also on the same, at the crowns of the arches, with the horizontal string-course under the windows. The arcade thus escapes any appearance of a mere surface application, and asserts a true organic articulation with the body of the building. The intrados of the arches carries the toothed zigzag, so well executed and accurately divided, that the members exactly fit both the effective pointed arch between shaft and shaft, that is brought out by the arrangement of interference, and the segmental division that re-appears above. The flatness of these arch mouldings is in excellent harmony with the sobriety of projection that reigns in the pilastral buttresses, the angle turrets, and the corbelled cornice.

The west front of the chapel, escaping all the confusion of buttresses, has a group of three round-headed windows, the central larger and taller, set symmetrically above the continuous series of arcade arches. There is an appearance, however, in the disintegrated ashlar below the central window, that the series of shafts, though not of the interfering arches, was originally partially divided by some architectural attachment,—a niche or shrine.

The heads of these triplet windows appear to be either parts of semicircles, or rather, perhaps, describable as flattened semicircles. They are enriched with forms of what may be called reeded zigzag, descending on shaftlets. The patterns of the sides differ from that in the centre, and it seemed to me that their places might have been with advantage transposed.

Already, on the exterior, we are struck—if we indulge the sentiment of art for a time, and leave aside veneration for antiquity,—with a disharmony which will obtrude itself again in the interior,—a conflict of form between the round and pointed arch. It were futile to fall back upon obsolete speculations as to the origin of the pointed arch, from the interlacing of round Norman arches, but it were no less futile to ignore how the development of semicircular arcuation evolved of necessity forms of pointed arches, and so introduced of its own motion a discord that, had all other influences held aloof, must necessarily have led—if ever the true sentiment of style were given to the world—to the ultimate predominance of the form that, other advantages apart, was susceptible of independence from its endless susceptibility of variation. The tallness and closeness of spacing of the shafts of the wall arcades cause the lines of their arches to intersect at a most marked acute angle, and this form is emphasized by the continued zigzag moulding of the meeting limbs on the same plane, while the semicircular outline of the extrados is left to be inferred among the confluent mouldings, or intimated at most by an incised line. This effect is still further exaggerated in the still taller proportions of the arcades that ornament the free turrets.

In the interior the intrusive form obtains all the additional force conferred by predominant magnitude.

To judge by the traces of the wall arches, the height of the interior scarcely exceeded from 30 ft. to 32 ft., and the vaulting ribs sprung from the abacus of a triplet shaft, ranging with window cills at about half this height. The chord of the diagonal rib of each severy, about 25 ft., seems, as nearly as possible, equal to the width of two severies. The dimensions of the interior being thus:—Length, 50 ft. to 53 ft.; breadth, 23 ft. to 24 ft.; height, 30 ft. to 32 ft. These limits, which do not pretend to exactness, as taken from a diminutive plan, are quite near enough for our present purpose.

We regard it as certain that the diagonal ribs, the widest arches in the building, were true semicircles. Crossing, as they do, towards the walls at an acute angle, the consequence is necessary that a wall arch enclosing the windows, to reach the same height, and starting from the same level, must be pointed, and such accordingly is the trace that remains inscribed upon the side walls; still more importantly the main transverse ribs which commence again from the same level, and have to reach the same height from a smaller chord as necessarily meet in a point; the vista down the chapel, therefore, from end to end, gave ever the section of a pointed arch, no less than the transverse aspects, and the outline of this arch remains again upon the western wall, enclosing in its large sweeps the triplet round-arched window. The diagonal ribs have only roll mouldings; the transverse rib is much more important, and bears a bold combination of rod zigzag upon a semicircular core between pairs of smaller roll mouldings on either side. The vista of pointed arcuation was thus defined with the greatest force.

The pointed arch has thus by mere spontaneous evolution, and as if apart from design, and to the fatal detriment, indeed, of the style which has led up to it, acquired irresistibly the upper hand; it has only to invade the windows, which are still at present exempted through inveterate tradition, for the victory to be complete. It might, however, have been long indeed before this last step was taken, but for the influence of bolder geniuses who dared to anticipate,—to precipitate evolution,—by revolution. These are the men who seem to make opportunities, but, in truth, obtain their advantage by being ever expectant and on the watch for them; who not only catch sight of a new principle at its very first emergence, but who are gifted with imagination co-operant with power of logical deduction, to recognise all that it implicitly condemns and abolishes, and much, if not at once all, that it postulates and promises;—men who are gifted, moreover, with the courage to press a principle at once to its uttermost consistent application, break with whatever tradition, set aside whatever authority they may. Many influences concurred, no doubt, to the early developments of the Gothic style; it were vain to exclude the Eastern influence from ecclesiastical architecture at the very time when the philosophy of Averroes was reacting with such vigour upon ecclesiastical study. So much the greater was the merit of those who welcomed materials from any quarter, but modified all in subjection to one vital principle which it was their glory to have divined. It was in France that the Gothic system was first truly harmonised, and it is difficult not to be struck by the contrast of the progress of the style as between France and England, and as in a degree characteristic of the nations.

The spirit of progress is alive in both, but the spur in one case is somewhat overplied, and in the other, shall we admit it, the curb. Tenacity of precedent has here to be responsible for delays and incongruities that elsewhere are escaped in virtue of ruling avidity for novelty, albeit at expense of many a stumble. Of two competitors eager for advance, one will give up nothing without a compelling reason, and the other will retain nothing unless under compulsion. System is the first requirement of the one whatever has to be sacrificed; it may be no less the ultimate aim of the other, but the risk of sacrifices meanwhile, is sorely appreciated.

* See p. 21, *ante*.

In St. Joseph's Chapel, we see the round arch architecture fairly taken by surprise by the self-generated pointed arcuation, and the incongruous forms are left together with no attempt to relieve the incongruity. The architecture ought scarcely to be styled, as it usually is, advanced Transition,—it is rather a case of primary and frank Collision. When we pass to the remains of the abbey beyond, we still encounter incongruities scarcely less harsh; but this is no longer because the pointed arch is obtrusive in advance, but from the reluctance, the recalcitration of the Norman style in its necessary retreat. In the happily preserved chapel of the north transept fully developed Early English details are associated with the toothed zigzags of the Norman chapel in most elaborated combinations, very exactly worked, but not more out of harmony in outlines than in excess of massiveness relatively to the slender shafting; in the remains of the aisles, we see that if the pointed arch is adopted for the windows within, they are inclosed on the exterior (so the architect solaces resolution) by a semicircular.

The architecture of the chapel of St. Joseph, so called,—in reality the *vetusta ecclesia*, the church dedicated to the Virgin,—marks its own date most characteristically at the very crisis that transferred the rule of England from the Normans to the Plantagenets. The foundation itself was, doubtless, very ancient—as early as King Ina, at least; its importance is proved by the fact that the Saxon abbot of Glastonbury was one of the seven hostages that the Conqueror took with him on his first return to Normandy. His grandson, Henry II., after keeping the abbey in his own hands for some six years, laid the foundation of the new church in 1184. The direction of the work was committed to his *camerarius*, Radulphus, son of King Stephen. "He completed the church of St. Mary," says Adam de Domersham, "in the place where from the beginning the *vetusta ecclesia* had stood, building it of squared stones of the most beautiful workmanship, omitting no possible ornament." This praise, both of ashlar and ornaments, is fully borne out by the remains; the Norman zigzag receives here almost its last developments in many variations and combinations of toothed and bent rod zigzag. The patterns on alternate windows differ; among them are the ingenious examples that are introduced in the beautiful north porch of Wells, but there in union with Early English floriation, and surmounted by the exquisitely perforated drip moulding.

When we regard the broad contrast between Norman and Early English, we may be disposed to think that never was a transition so sudden and complete—scarcely that which we know and some revile, as the Renaissance. When we pass and repass from the chapel at Glastonbury to the abbey, and to the cathedral of Wells, we may be sometimes disposed to think that never was transition more prepared and inevitable.

Whichever view we incline to we must recognise with admiration the architectural genius that carried through the change so rapidly, and, with whatever occasional hesitations and inconsistencies, to a point of such high comparative completeness at last.

In this last Norman work under the first Plantagenet, we have lively promise of the refined and elegant style that was imminent; we have notice, too, of a difficulty that in England at least was scarcely effectively surmounted. This work is very closely of the same date as the round church of the Temple in London, and when we compare the Early English church which was attached there, we cannot but recognise a sympathy where we would willingly have missed it.

At Glastonbury the height of the vaulting shaft does not exceed, perhaps does not even equal, the vertical height of the vault, and the general effect could not but have been that of lowness and oppression, of heaviness and confinement; the spring of the ribs so low down as from level of window-sill necessarily brings the groins of the vault so much in front of the upper portion of the windows as to interfere with both the view of them from the end of the church, short as it is, and the diffusion of light.

We may also notice a carelessness of articulation of the side and transverse walls, that declares itself indeed often much more unpleasantly in the Early English structures of very high pretensions. In the angle of the interior there is only a single shaft which receives the diagonal rib, and there is no trace over the triplet-window where the outline of the vault is inscribed,—of any transverse, which would here be a wall-rib,—to correspond with the broad and boldly-moulded transverse ribs of the bays. The result is a failure of emphasis at an important juncture and termination where its requirement does, indeed, receive an acknowledgment, but quite illusory, in a slight modification of the base.

When the crypt was inserted in the fifteenth century within the lines of the foundation, as is so satisfactorily proved by Professor Willis, the pavement was raised to the level of the bench-table that carries the bases of the wall-arcade and vaulting-shafts; and thus the original defect of lowness was still further recklessly enhanced.

The flat pilastral buttresses terminate with an oddly-moulded attached finial some distance below the external cornice. The point at which they terminate may have reference to their implied service to the vaults within; but their summits range with no visibly expressive line,—no feature that betrays such organic dependence; and, in the absence of any hint of reason why they went so far or stopped when they did, the effect is inevitably inconsequent and frigid.

Professor Willis says they end "with a corbel, which probably carried an image;" but this we seriously doubt.

The round recessed north door of the chapel has a roof-shield moulding above it, very depressed, and leaving the least possible vacancy between the crown of the extrados and the apex of the shield,—an intimation of the probable and commendable parsimony of vacant space between the lost roof of the chapel and the vault.

THE STRUCTURAL UTILITY OF IRON.

RECENT incidents cannot fail to awaken a certain degree of interest in architectural and engineering circles, apart from that which is associated with the fracture of the Holborn Viaduct columns. In accordance with the conclusions of those whose opinion in such matters is regarded as deserving every attention, it would appear that the perishable nature and properties of iron as employed in static engineering no longer forms the principal object to be considered in reference to its utility or value as a building material. The decay to which iron is exposed from atmospheric changes and by variations of temperature has long been within the knowledge of many, and more recently the transitional qualities which iron and steel have been observed to possess, have attracted more general recognition. The molecular aggregation and dissociation of iron have been demonstrated to such a point of clearness that the material may be said to be capable of being held in atmospheric tension more eminently, perhaps, than any other substance employed in building. In addition to this circumstance, the molecular capacity of iron is known to be such as to admit of essential changes of its properties and functions. The same bar of material would, in accordance with the varying conditions of its employment, exhibit all the features and elements of new and distinct substances. The freedom of motion to which the constituent elements of iron and steel are known to be susceptible admits of the presentation of various orders or classes of fracture in the same sample, and the nature of such fractures may be said to determine the practical limits of the adaptation of iron as one among the materials of construction.

The sudden fracture of railway-carriage axles is sometimes attributed to a change effected in the material by vibration. After subjection to vibratory tests, a bar of fibrous iron has been observed to have completely changed, presenting a granular or crystalline fracture it may be; and it is equally possible that a crystalline or granular sample should, under certain conditions, acquire the properties and features of a fibrous specimen. The singular atrophy, or withering away, to which iron, under some circumstances, is liable, and of which a familiar instance may have been noted on the part of many at the base as well as in other parts of iron railings, may readily suggest itself. Although an incident probably in a measure now obviated, and comparatively of but little moment, such exhibitions, notwithstanding that they may be said to be capable of being effectually remedied, invite special observation on the part of those who may be led to widely adopt the employment of iron in construction.

It might be unavailing, if not altogether devoid of interest, to single out the more trivial and fortuitous examples of the speedy decay to which the material under consideration is occasionally seen to arrive, but the total and intrinsic degeneration of such a substance by its mere proximity to others, whatever the process through which such a result is reached, is a subject possessed of unequivocal claims to investigation. In alluding thus prominently, it may be viewed by some, to what may be open to be regarded as the more unfavourable elements of this question, we would be understood as far from discountenancing the application of iron in a constructive direction. Many circumstances, however, we incline to think it would be agreed, contribute to indicate the necessity of some selection as to those conditions under which its employment would become more appropriate and effectual.

Upon the completion of many important erections in which iron is seen to have been largely employed it is by no means an infrequent occurrence to observe that opinions are in certain directions at once set in motion, to the detriment of the undertaking in many instances, it may be gratuitously, but in the general result uniting to diminish the assurance of the public with reference to the stability or safety of such structures.

It has upon some occasions unhappily proved too well founded that substantial grounds may have existed for some amongst the numerous deductions to which these speculations are likely to lead, while in other instances the conclusions which have been derived have been altogether disproved or shown to have been unfairly or unduly exaggerated.

It is a matter confessedly of such difficulty, even in engineering circles, to assume an unconditional responsibility with reference to some of the reputed properties of iron, that a tendency has declared itself on the part of those more intimately interested in that science in connexion with which its structural use is so closely associated to endeavour to discover continually improving and more favourable modes of its application.

It is this latter view of the subject probably which may be considered to possess more special claims to the notice of our readers, nor should it be omitted to be conceded that in entering into a more critical examination of what few would probably treat as altogether unimportant the modest pretensions which have been put forward on the part of the engineering profession are calculated to invite considerable forbearance, and may happily induce the supposition that the authority which age and experience can alone impart to the principles of any art or science may be expected to operate in its favour as it has done in many analogous instances.

Perhaps the most complete and authoritative inquiry which has yet been made with reference to the utility of iron for purposes of construction is that which was instituted some twenty years ago before the committee for inquiring into the application of iron to railways. Since the time at which those investigations were conducted, the theory of the structural utility of iron has sought to embrace such conditions, and the processes of the manufacture of that material have undergone such modifications, that in the future interests of architectural, no less than engineering, science, it would appear far from undesirable that some similar inquiry should now be established.

The important experiments upon the properties of iron and steel which we owe to Mr. Kirkaldy, and to which we had occasion to allude in a notice of Mr. Bindon Stoney's lately-issued work "On the Theory of Strains in Girders and similar Structures," would almost of themselves suggest the wisdom of farther legislative inquiry; for while manufacturers and public alike may appeal, in a certain measure, to the results of such experiments as likely to exercise a salutary check over the constructive application of the materials in question, it is the result of a purely voluntary and promiscuous system.

It may be fairly questionable whether the subjection, say, of the whole series of links of a suspension bridge to a fixed and arbitrary strain, is calculated to enhance the stability of such structures when erected.

Mr. Stoney, in stating that the functions and properties of iron become changed after its subjection to various strains, has recorded what has long been known perhaps in a less determinate form. Whatever may chance to constitute those obscurer qualities in iron and steel to which attention is attracted upon the occurrence of unexpected ruptures or disasters through the employment of those materials, it is obvious that they appear calculated to afford important

constructive facilities, and will always invite employment in some building capacity. It is of practical moment, therefore, to the architect to seek to bring under more critical examination the occasions of failure in either of those materials in their structural application. The fall of the Manchester Station roof, some two or three years ago, it may be remembered, was attributed to a flaw in some portion of the casting; while the more recent instance of the Caledonian Station has been laid to the account of a tie-bar giving way; and in the case of the Ludgate-hill Station, the accident was referred to the simple misplacement of a strut.

It is with no intention of imparting an undue importance to such incidents that we make reference to occurrences some two or three years old, but the integrity of an extensive undertaking, it may be in iron, has been so frequently traced to, and imperilled by, the giving way of some trivial support, or member of the general structure, that the circumstances may demand pointed observation in any further inquiries into the strength and adaptation of such materials. In reference to novel discoveries in static engineering and attempted improvements in the application of the materials with which that science is identified, it cannot but afford matter of congratulation to notice any instances where it may have been more clearly shown that undoubtedly successful results have been attained.

Although the extraneous successes of certain engineering experiments may be said to possess less interest in architectural circles than where it has been sought to import similar endeavours into the domain of architecture, it must necessarily be of interest to note those claims which are occasionally alleged upon special grounds, with reference to the allied arts of construction. Apart from the employment of iron, so obviously has the theory of engineering been necessarily founded upon certain of the principles of architecture, that a sense of usurpation reigns in engineering circles wherever the distinctive element is more notably absent; and this it is which, in the opinion of some, might be held to shed light upon the assertion of an eminent member of the profession, that it has been very unsatisfactory to attempt to describe in a few general words what a civil engineer really is.

As an illustration of the more unfixed elements upon which the art of construction in iron is yet based, reference might be made to the evidence which was given by Mr. Robert Stephenson before the Committee of Inquiry, upon the application of iron to railway structures. The report of this Commission is known to be still regarded as of high authority in engineering practice, and the circumstance may be noted with all the more pleasure, as instancing the undoubted progress which has been made since the time of the inquiry in the profession to which it relates.

Upon being asked as to his opinion with regard to suspension-bridges, and whether he considered them at all applicable to railways, Mr. Stephenson replied, "To a very small extent. I do not think, with the prospect of our weights increasing upon railways, that you can run a locomotive over any chain-bridge in existence."

We have already had occasion to advert to the opinions which have been derived by Mr. Edwin Clark as to the construction of suspension-bridges, wherein he expresses his belief that the erection of a suspension-bridge sufficiently rigid for the purposes of locomotive traffic would be tantamount to the construction of a tube. Mr. Peter Barlow, whose experience in the structural application of iron entitles his opinion to great weight, is at issue with Mr. Clark, and remarks that, "although unsupported by fact or experiment, Mr. Edwin Clark's theory has been received and acted upon, not only by a large portion of the public, whose impressions of suspension-bridges are derived from what had hitherto been constructed of insufficient strength and without being combined with a girder, but it had been received and acted upon by engineers of eminence in this country."

In the inquiry before the Commission to which we have alluded an important exception was taken by Mr. Stephenson in favour of a system of suspension bridge which at that time attracted considerable notice. The discovery invited such attention that Lord Western was induced to communicate at great length with Viscount Melbourne as to the superior applicability of the system to the repair or renewal of the Menai Bridge, deducing from actual experiments its merits in bridges of large span. This class of structure is known as Dredge's Patent Taper Suspension Bridge. Lord Western observed that the inventor insisted on the possibility of reconstructing the ironwork of the Menai Bridge at a less sum than the superfluous iron would sell for, pledging himself to the power of the bridge if the irons were altogether altered, using Lord Western's words, and reconstructed on his principle, to be capable of supporting on transit 1,000 tons.

The main principles of the Dredge suspension-bridge would seem to be comprised in the employment of pyramidal suspension-chains, and the substitution of oblique for vertical rods for connecting the suspension-chains with the roadway. The invention of Mr. Dredge, with reference to the application of iron in the erection of bridges more particularly, was supposed to embody such important structural principles that, apart from the exception which was made in its favour before the Commission to which we have referred, it may now upon various grounds be found to possess further claims to practical consideration.

The Dredge principle is stated to have been founded upon the view that bridges are only brackets, and should be dependent upon their bases or abutments, and the strength of the material of which they are constructed, like the human arm, which depends on the shoulders, and not on the fingers' ends, or the limb of the oak, which is sustained by the larger part of the branch that grows from the tree, and not by the ends of the twigs at its farthest projection. Bridges have hitherto been made to rest on their centres, as beams in architecture, and hence the superfluous material in them, with the immense accumulation of leverage that exists on their centres, is the cause of their undulation and destruction. In a common bridge, whose depth is one-twentieth of its length, and the weight 1,000 tons, the central forces are computed at 5,000 tons, instead of which no description of force or weight, according to the Dredge principle, should exist on the centre of the arch of any bridge, for it is but the extremity of two projections. The operation of the system is therefore in the direction of the annihilation of these static forces, which of themselves tend to destroy the structure, and to counteract which an excessive quantity of material must necessarily be employed, in accordance with more usual practices. One of the more important elements in connexion with the erection of all suspension structures of the nature in view has been the acquisition, at the least cost, of the maximum rigidity, and to accomplish this various expedients have been suggested and employed. In the original suspension-bridge which existed at Hungerford Pier, in the line of the present Charing-cross Railway, the lateral motion, as well as the deflection, of that structure under passing and unequal loads was remarkable. In that case, as in the present Hammersmith and Chelsea bridges, the roadway was attached to supporting-chains by vertical rods; but in the substitution of oblique bars in the Dredge system, considerable rigidity was supposed to have resulted. A more special treatment of this element of bridge construction may be noted in Koch's system of suspension, a class of structure perhaps deserving of fuller notice than it has yet received; but the more conspicuous instance is that to be observed in the stiffening which has been imparted to the Niagara Railway Bridge by means of timber trussing following up the direction of the chains. This feature has been reproduced in Lambeth Bridge, iron being there, however, substituted by Mr. Barlow for the timber, as employed in the Roebling system. In most of the instances which we call to mind the metallic section of the supporting-chains has been uniform at any point along the span, nor do we remember any case of such singular deviation from this principle as that to be noted in the pyramidal chain-bridge. The attempted economy of material towards the centre of lattice girder bridges may faintly shadow out the principle involved, and we cannot resist the impression that an exaggerated view has been taken as to the possible saving of material as between the Dredge principle of suspension and others. Perhaps the most exquisite adaptation of iron to structural purposes—that is, in a useful sense—to which we may refer, is instanced in the case of the London, Chatham, & Dover Railway Bridge, erected at the crossing of the Thames at Blackfriars; but it seems unhappily possessed of fewer lasting elements than its present neighbouring structures.

The results of the experiments which were communicated by Lord Western to Lord Melbourne, upon the distinctive features of the Dredge bridge would appear well calculated to attract the attention of the scientific; but, as we have before had occasion to notice, the extreme divergence of views entertained by the more eminent professors of engineering detracts from the value or importance, in a measure, of individual conclusions. Whether greater triumphs may be derived from the application of wire cables, assisted by vertical and horizontal trussing by the system of pyramidal chains and oblique suspension-bars, or by the tubular system conjoined with chains, or in the form of tunnels, we would be indisposed at this moment to venture to predict; meanwhile attention is being attracted to more recent discoveries as to the structural application of iron and steel. Out of the mass of conflicting and antagonistic evidence with which the theory of engineering is obviously beset, it would afford matter of congratulation should some settled principles be evolved, and it is because we incline to the view that at length some tendency in this direction may be detected, that we would seek to bring under notice some few of the more striking features of that art.

INSTITUTION OF CIVIL ENGINEERS IN SCOTLAND.

THE address of the president, Professor Macquorn Rankine, has been published: we take from it two or three passages:—

Sand Concrete.—It has long been known how greatly the execution of breakwaters, and other harbour works and sea defences, is facilitated by the use of blocks of concrete instead of natural stones; because such blocks can be made of any size that may be required in order to resist the force of the waves. It has lately been shown, by the mode of construction used in the breakwaters of Port Said, at the northern end of the Suez Canal, that such concrete may be made of hydraulic lime and sand alone, without gravel or stones.

Ventilation.—A branch of sanitary engineering not less important than water supply and cleansing, is ventilation; but its difficulties and imperfections are in some respects of an opposite character. In the branch which deals with liquids and solids, we find that the supply of pure water is comparatively easy, while the removal of refuse involves matters of dispute and perplexity. In the case of ventilation, on the other hand, appliances for the removal of foul air are well known and extensively used; while the supply of fresh air, though in some cases efficiently provided for, is in other cases neglected; and there are too many instances of the latter class. We too often see large and splendid public halls, in which outlets for foul air have been most carefully planned and executed at various points of the roof, while the supply of air has been left to the casual opening of a door, or to the currents which the pressure of the atmosphere may cause to enter through drains and soil-pipes, or down disused chimneys. There are many exceptions, however, to this remark to be found in buildings where the supply of fresh air has been amply and skilfully provided; and the number of these exceptions is fortunately increasing. Care should be taken not to under-estimate the supply of fresh air required by the inmates of a building: experience has proved that each individual requires at the very least 20 cubic feet per minute, and that if possible he should be supplied with 30 cubic feet.

Engineering Education.—The movement which is now so active for the extension and improvement of technical education, is one in which the members of the various branches of the engineering profession are deeply interested. The objects carried out by those who promote technical education may be classed under four heads: providing teachers, providing buildings, providing the materials of instruction, and providing scholars. A step was made by the Government about thirty years ago towards the providing of teachers of the scientific principles of engineering, by the founding of chairs of civil engineering and mechanics in some universities; amongst others, that of Glasgow. The efforts of the holders of those chairs met but with partial success, until their teaching was made to form the conclusion of a systematic course of instruction in the various sciences bearing on engineering. After that systematic course had been established, the students steadily increased in number, diligence, and ability. More recently much

has been done to increase the number of teachers; and I may mention, as specially worthy of honour, the establishment by the Government of the Royal School of Naval Architecture and Marine Engineering; the contributions of the inhabitants of Manchester towards the endowment of Owen's College; and the foundation, in the University of Edinburgh, by Sir David Baxter, with aid from the Government, of the most liberally endowed chair of Civil Engineering in the United Kingdom. As regards the provision of buildings, I know of no instance of munificence to be compared to that of the inhabitants of Glasgow and its neighbourhood. The amount of their subscriptions to the fund for the new University Building, taken together with the Government grant and with other resources, has enabled that building to be executed on a scale which will provide most ample and convenient accommodation for the engineering department, as well as for other branches of study, which have hitherto been conducted, in the old College, under great disadvantages as to space, light, and air.

The objects which give the most important aid to instruction in engineering science are those examples of materials and workmanship which are to be seen in actual structures and machines. Nevertheless, a good collection of specimens of engineering materials would be of great service in connexion with the engineering department of a university; and so also would a collection of models, drawings, and instruments, though less important than specimens of materials.

It is only necessary to name to you Sir Joseph Whitworth, in order to remind you of the magnificent endowment which he has provided for students of mechanical science and practice combined.

It is evident that the value of scientific education to engineers is at the present day duly appreciated, and that the means of obtaining it are being rapidly extended, and indeed are in many cases promoted with enthusiasm. Just as in every similar case, in which a good object is earnestly pursued, there are errors against which it is necessary to guard. One is, to expect results from the scientific branch of education which it is not really capable of accomplishing. The purely practical parts of engineering, such as the use of tools and the superintendence of work, cannot be soundly and thoroughly learned except through experience in real business; and it is a mistake to endeavour to teach them during a university course. The true laboratory for students of engineering science is to be found in the workshops of such cities as Glasgow, and amongst the earthwork, masonry, carpentry, and ironwork of engineering structures in progress.

THE EARLY YEARS OF RAILWAYS.

MR. VIGNOLES'S ADDRESS.

WE quoted in our last a portion of the address delivered by Mr. Chas. B. Vignoles, F.R.S., as President of the Institution of Civil Engineers. It contains so much that is valuable that we are tempted to make some additional extracts:—

Passing over intermediate years, let me come to my proper task and attempt to recall some of the memorable chain of occurrences, in the earlier days of the railway system, when that grandest improvement among the many ameliorations of the first quarter of this nineteenth century began its earliest struggles for general adoption. It is to the courage and enterprise of the mercantile and manufacturing communities of Liverpool and Manchester that we owe their introduction, and benefits such as we have enjoyed during the last forty years.

The trade to and from the port of Liverpool had long been outgrowing the existing means of inland carriage. The two great carrying companies, popularly known as the "Duke" and the "Old Quay," had provided it with water transports during three-quarters of a century, as, for a shorter period, had the "Leeds and Liverpool Canal;" and the many wagoners along the rough paved highway had supplied the road conveyance. But it may readily be imagined that, with the rapid increase of commerce subsequent to the close (in 1815) of our long series of wars, all of them were insufficient.

When the first steam-engine had only been erected in Manchester in the year 1790, not a power-loom had been introduced until twenty years later, and the population scarcely 40,000, when the port tonnage and population of Liverpool were small—when the first casual importation of eight bales of American cotton in the year 1784 was so strange that it was seized by the Customs officers, under the conviction that it could not have been the produce of the country which the invoice stated it to be; the trade of both towns was unimportant compared with that of 1824, by which time Manchester had 150,000 inhabitants, 200 steam-engines at work, and 30,000 power-looms employed; then dock-dues at Liverpool were paid by 10,000 vessels, the population was 135,000, and upwards of 400,000 tons of cotton were imported yearly; goods in transit between Liverpool and Manchester equalled fully 1,200 tons daily, besides upwards of a million tons of coal carried annually into those two towns. Thus the aspect of commercial affairs had totally changed, though the means of conveyance remained unaugmented and unimproved: hence arose vast pressure and enormous sacrifices to ensure speed and certainty in the delivery of goods. This could only be done by land carriage, sometimes at almost ruinous cost. Some remedy was imperative, some competition indispensable, and the inquiry became necessarily limited to the form in which it should be devised and applied: it was not long before deciding that the remedy should be by means of a railway.

Railways, though rude, had existed in the coal counties on the Tyne and the Wear for 200 years previously, but since the beginning of the present century they had improved and multiplied rapidly, but were still only short isolated private undertakings, appropriated exclusively to the transit of coal. In 1822 the first public railway for goods, coals, and passengers was proposed between Stockton and Darlington: it was unsuccessful in Parliament from the opposition of the landowners and coal proprietors, but next year the Act was obtained. About this time, William James, a London engineer, had suggested just such another railway to the mercantile men of Liverpool, to supply the great want of conveyance between Liverpool and Manchester, and James made the first actual survey. It was not adopted, but the idea was entertained and ripened. The water-carrying companies refused to reduce their tolls, the alternative of road conveyance was impracticable, from its limited resources and great expense; but independent of tolls, the endless delays on the canals, the pilferage of the merchandise in transit, and the terminal obstructions from want of space, left no hope of improvement; and in 1824 the first prospectus for the Liverpool and Manchester Railway was issued, the appointed committee prepared their plans under the advice and direction of George Stephenson, and lodged them for application to Parliament in the ensuing session.

The anticipated strenuous opposition to the scheme was not long in becoming realised. The three bodies of canal proprietors, each in itself no despicable opponent, forgetting their mutual animosities and former disagreements, banded against the new rival in formidable array, acting on common impulse, organised under most skilful direction, upholding with tenacity their vested interests, claimed as rights; and prepared at all hazards to resist and crush down so intolerable an innovation on established modes of communication, and on their chartered privileges and long-maintained monopolies.

Two noble peers, Lord Sefton and the great-grandfather of the present Earl of Derby (whose estates the railway crossed, and have since so vastly improved those belonging to the latter nobleman), made common cause with the canals to prevent the passing of the railway bill. It was battled during three months through the House of Commons. Every possible objection was taken. Imperfect plans, erroneous levels, interference with parks a mile distant, danger, nuisance, and incompetence of locomotive engines, deficiency of estimate, impracticability, especially in crossing Chat Moss. One very eminent engineer affirmed that the probable expense of crossing that moss would exceed 200,000*l*., though the real cost was actually within 30,000*l*.

I should inform those of my hearers, who have not watched the different changes which have taken place in the practice of passing private Bills through Parliament, that in those days committees on Bills, and even on standing orders, were open to every member of Parliament who chose to attend, were it solely for the purpose of voting upon the preamble or merely on a particular clause. *The whip* for the first division was tremendous. The preamble of the Bill was carried by a majority of *one* only in the open committee to which seventy-three members had been pressed. It must then have been considered hopeless to persevere; next day the clause, empowering the company to make the railway, was lost by a vote of nineteen to thirteen; the clause to take land was also negatived; the promoters then withdrew the Bill, and thus ended the first act of the great railway drama, which, even at the present day, is still far from being played out, although 100,000 miles of railway are now laid on the face of the globe.

Nothing daunted, the high-spirited committee, the very *élite* of Liverpool, called their parliamentary supporters together on the third day after the loss of their Bill, and, encouraged by them, resolved to persevere. And, hear it, my fellow-countrymen of Ireland, the most cogent argument used by the leading political men of that day who attended the meeting—an argument repeated in the new prospectus of the railway—was, the benefit which the railway would produce, directly and indirectly, to the agricultural interests of Ireland,—a benefit I can testify from my personal knowledge ever since, has been most abundantly realised; and, considering that it was an argument brought forward five-and-forty years ago, there is good ground for maintaining that the best interests of Ireland were then, as now, quite as much cared for as those of Lancashire.

It happened that I had returned, some two years previously, from occupations on the continent and in North America, both civil and military, all connected with engineering, occupying repeated absences from this country. Having watched the few railways then made, or making, I was fortunate in being selected by Messrs. Rennie to take charge of the new surveys, which the Liverpool committee immediately ordered under the direction of those eminent engineers. But the opposition of canal owners and land proprietors had become redoubled; and it was in the course of carrying out this duty that I was brought into contact with the celebrated Mr. Bradshaw, the devoted trustee under the remarkable will of that Duke of Bridgewater who employed Brindley to make his canals, and had charged Mr. Bradshaw with the sole and absolute control of them, and of his large estates, for the benefit of his future heirs, which he exercised for nearly half a century.

I was brought up before Mr. Bradshaw, at Worsley Hall, on a pretended charge of night poaching and trespassing; for I was often obliged to make surveys and take levels by moonlight and torchlight, so strict was the watch kept by day, by order of many landowners to prevent engineers from completing the necessary plans and sections. Mr. Bradshaw had contrived to earn himself a terrible name for severity, but I found him a gentleman. My only reason for recurring to such a mere personal adventure is, that some not unfriendly discourse passed between us on that occasion, which I communicated to the Liverpool committee. This led, I have good reasons for believing, to communications which, before the end of 1825, ended in those arrangements by which the then Marquis of Stafford, for himself and those of his family who were ultimately to benefit in the profits of the Duke of Bridgewater's canal, took 1,000 shares in the Liverpool and Manchester Railway Company, with the privilege of nominating three of the directors, arrangements confirmed by the company's first Act of Parliament.

On the 25th of September, 1825 (I note the special date) the Stockton and Darlington Railway was opened for public traffic. The surveys for the new railway between Liverpool and Manchester, commenced in the July preceding, were completed and lodged in November: then public attention awakened to such projects, and early in 1826 the Bill was again introduced into Parliament, under less discouragement. The opposition, however, though not so compact was as keen as ever, and the passing of so important a measure required every effort, every precaution, on the part of the promoters. The leading counsel opposing was the late Baron Alderson, next to Sir Frederick Pollock, the most accomplished mathematician and man of science then at the Bar, prompted in his crucial examination of engineers by your esteemed past-president, George Bidder, then as well known for his marvellous power of mental calculation as he has since been as a scientific and practical engineer. Few of my audience will be disposed to infer, judging from his subsequent career, that my old opponent Bidder was the most formidable enemy of the railway in its first Parliamentary warfare.

In spite of him, however, the preamble passed the ordeal of committee, this time with a majority of 43 to 18. The third reading was opposed in the Commons by the illustrious Lord Derby lately deceased, then the Honourable Edward Geoffrey Stanley, who made his almost maiden speech in that House against the Bill, with all the ardour of his character; but on a division, the numbers were 88 in favour, 41 against. The struggle was renewed in the Lords' Committee. One of the counsel for the railway was William Page Wood, then a junior barrister, now Baron Hatherley, Lord High Chancellor, and a very near neighbour of ours. On their last day of meeting in committee thirty-two peers were present, when the very old earl and his son-in-law, Lord Wilton, were the only dissentients. The third reading was carried without a division, though not without hostile speeches; the Royal Assent soon followed, and on the 29th of May, 1826, a general meeting of the subscribers was held in Liverpool, and the newly-appointed directors held their first sitting on the following day. Soon after George Stephenson returned to the post of engineer-in-chief, and the railway works commenced, and were vigorously pushed on for three years, until approaching near to completion, when it became necessary to settle the question of the motive power to be used on the railway.

It would occupy the time usually assigned to more than one address, were I to pursue the interesting record of the steps taken to solve this question; but I am not attempting an historical analysis—merely selecting a few reminiscences. I should have been very glad to have noted the proceedings known as the "Rainhill Experiments," having been myself present the whole time, in October, 1829, when the competitive trial of locomotive engines took place, ending in the grand prize being awarded by impartial judges to George Stephenson and Henry Booth jointly. It is from Mr. Booth's publication that I have been most unscrupulously abstracting. I will refer those who may be disposed to enter into details of such remote date to the pages of the Liverpool newspapers and the *London Mechanics' Magazine* of that period. Trustworthy, impartial accounts are to be found therein, and full justice done to my old friends, Braithwaite and Ericsson, whose engine, the "Novelty," was long remembered as the *beau idéal* of a locomotive, and which, if it did not command success, deserved it.

A great gathering of engineers from all parts was, of course, in Liverpool; and, as Englishmen are said not to get on well on important business without dinner demonstrations, the engineers gave on this occasion a grand banquet to the directors and officers of the railway, and to the competing locomotive engine builders. Of course speeches were made and healths drunk, and we toasted each other and everybody, except the waiters. Will you excuse me if I read from a newspaper report of our feast (in the *Liverpool Albion* of the 12th of October, 1829), two short predictions of mine about railways. I had had the honour assigned to me of returning thanks for the toast of "The President and Institution of Civil Engineers," and what I said is thus reported:—

"Mr. Vignoles, as a member of the Institution, returned thanks for Mr. Telford, to whom, as the constructor of many of our most important public works, the toast was due. His (Mr. Vignoles's) first step in life was as a military rather than a civil engineer; and as he was deputed to propose a military toast, perhaps he might preface it by some anticipation of what steam would do, in a military point of view. Supposing such a general as Napoleon were to effect a landing on our coast with a large and powerful army, and that he even were to be victorious upon his landing, armed as this country is shortly to be with railroads and locomovive engines, brief would be his triumph; for by return of post, as it were, parks of artillery and the whole military force of the country could be poured upon him, without even the fatigue of a march. Mr. Vignoles concluded with giving 'The Master-General of the Ordnance and Corps of Royal Engineers.'"

And a little later in the evening, having had to propose the health of the three judges of the locomotive competition, I stated, as reported:—

"Being engaged in laying out a railway between Goole and Barnsley, he (Mr. Vignoles) hoped to see that accomplished and made part of the union between the two sides of the kingdom, and that it might put it into the power of that part of the country to supply the metropolis with the article coal, at present furnished through sea transport by the great northern proprietors, whose monopoly, he trusted, would then soon be put down."

As regards my latter prophecy, my friends taking them either in alphabetical or geographical order, Barlow, Cubitt, Fowler, and Harrison, have now pretty well realised what I uttered about bringing coal into London by railway, though they only began some twenty-five or thirty years after it was first thought about. Still it has been most effectually accomplished. In respect, however, of what railways would be able to do, in case of the momentary success of an enemy invading this country, I have to remark that one of the earliest duties required by the War Office, after the establishment of our Engineer and Railway Volunteer Staff Corps, was to point out the means by which, in the event of such a disastrous occurrence, the railways could practically protect us; and the answer we returned went to the effect of demonstrating that within forty-eight hours after the alarm had been sounded, the whole military force of the country could be poured down upon the enemy, on whatever coast the invading forces might land, without, excepting in a few limited cases, the fatigue of a single day's march. I would have asked our illustrious honorary member, Field-Marshal Sir John Burgoyne, whom I hope I may be permitted to call old friend (whose illness, I regret to say, has alone prevented him from doing us the honour of being present this evening), but in his absence I appeal to the Inspector-General of the Royal Engineers, Sir William Gordon, whom I am proud to see here, whether our replies were not complete and satisfactory, and whether what was thought at the time to be the mere boast of a dreaming enthusiast, is not now ready for realisation at any hour—though God forbid that that hour should come, even though it found us fully prepared, as forty years ago I ventured to anticipate we should be.

I am thus led to a subject which I had intended to mention previously, but here seems the most appropriate place. The civil engineers, as a body, were first so called by Belidor, to distinguish them from the military engineers. It may be readily understood, however, in how many cases the military professional operations would partake of the civil elements. On such occasions, when appealed to, as in several recent instances, we have always been most willing to give our military brethren any advice and assistance in our power, as has been repeatedly acknowledged.

But now a new era is coming upon us, which will bring us much more in connexion with the military service. First, by the organisation of our National Volunteers, in which we, as engineers and artisans, have largely partaken, giving to the movement our professional skill; and, secondly, in consequence of the general extension of railways, and the recent introduction of the new powerful arms and implements, none of which have been as yet subjected to any regular fully-devised system, even in the most recent wars but which will necessitate increased influence of engineering in military operations, the full consideration of which we, as civil engineers, including the most eminent of our body, are using our best efforts to develope; and we have the satisfaction of finding these efforts appreciated by military and naval officers of the highest distinction and experience.

I need scarcely say that a year or two before, and, of course, immediately after the opening of the Liverpool and Manchester railway,—the attention of the public generally had been drawn to the new system of locomotion; a number of projects were brought forward, and many more were in contemplation, especially a railway from London to Birmingham, and another from Birmingham to Liverpool; for amalgamation had not then become the order of the day. Among others was a plan for connecting London and Paris by railroad, viâ Brighton (or, rather, Shoreham) and Dieppe, the long sea transit not being then deemed so objectionable, considering the distance between the two capitals by this route was the shortest by sixty miles.

A powerful combination of capitalists was formed, and soon after the change of monarchy which placed Louis Philippe on the throne of France, I was sent over to negotiate for a concession in the French dominions. I had the honour of several interviews with his Majesty; the celebrated statesman, Thiers, then Minister of Public Works, was sent to England, and soon after M. Le Grand, his Under Secretary of State, came over. I had the honour of escorting them one after the other through the manufacturing districts and along the railways, some of which I was constructing, and I thought I had convinced them both of the advantage which the railway system would be to France.

After some considerable time occupied in inspecting everything which I thought most likely to interest these two chiefs of the Public Works of France, and conveying them over road and railway at a pace at which I am sure neither of them had ever moved before, M. Thiers took leave of me in a speech full of compliments and polite phrases, which I will attempt to paraphrase in plain English:—"Mr. Vignoles," said the accomplished statesman, but bad discriminator, "I am infinitely obliged to you, and I think you a very clever fellow, but, do you know, I did not believe a word of what you told me before I came, and now I cannot see the great advantages you were constantly dwelling upon. You have good canals—but very small, and ours in France are much superior. As for your roads, they are very good, but I have not met a merchandise wagon on them in the whole of my journeys. *I do not think railways are suited to France!*—And as to your vaunted posting, we go quite as quick in France." Perhaps this last remark was not to be wondered at, for M. Thiers had insisted on bringing over to England his own heavy lumbering vehicle, quite à la Louis XIV., with immense lamps, like the old Paris reverberators, at the four corners on the top of the coach, which carried heavy Imperials, and eight or nine persons in and out, requiring six horses most of the way.

M. Thiers returned to Louis Philippe, and reported against the introduction of railways. He made violent speeches in his place in Parliament as Minister of Public Works, adverse to them, and the benefit of railways to France was postponed for eight or ten years, of which M. Thiers has been repeatedly and sharply reminded by his political opponents, when lamenting his shortsightedness. But his deputy, M. Le Grand, was somewhat more reasonable. He left a staff of young engineers to study our system of road-making, and it was copied closely in all the new roads subsequently made, and the Macadam principle of repairing was adopted; and, in fact, from that period the roads throughout France have been changed, greatly for the better. I cannot but acknowledge that the way in which roads in that country are now kept up is superior to our own—especially as regards our mode of forcing good horses and light carriages to grind down broken stone. In France they keep many of the roads clear from mud in winter, and from dust in summer; and where road materials are scarce and dear, they find a great economy in doing so.

Mere politicians called upon to consider and judge of engineering naturally fall into errors which, if excused, cannot be easily forgotten; but what can we think, or rather what ought the engineers of France to think, of a system which placed at their head a statesmen, who, virtually, robbed them of the glorious opportunity of doing for themselves and their country what, after years of injurious delay, fell into the hands of English engineers and capitalists, they becoming the first practical introducers, on a large scale, of railways into France? A system, which, in my judgment, notwithstanding many advantages, hangs like a dead weight on the talent, genius, and invention of that country.

* * * * * *

STATISTICS.

1868-69.	United Kingdom.	France.	Prussia.	Spain.	United States of North America.
Railways (English miles)	14,247	10,302	5,603	3,331	42,572
Metalled Roads (ditto)	160,000	100,048	55,818	10,886	...
Navigable Rivers (ditto)	...	6,015	...	...	...
Canals (ditto)	3,000	3,154	...	...	...
Telegraph Lines (ditto)	22,165	23,830	13,881	6,922	...
,, Wires (ditto)	96,104	67,473	45,708	15,263	92,099
,, Stations (No.)	2,432	1,701	830	184	...
Post Offices (No.)	17,741	5,099	3,942	...	25,200
Letters (No. Yearly)	808,118,000	537,099,358	270,000,000	...	631,010,000
Newspapers and Book Packets (ditto)	105,845,000	351,076,008		...	...
Area (English square miles)	122,519	210,460	139,675	198,061	3,591,849
Population (No.)	30,621,431	38,192,064	23,970,941	15,673,481	38,442,995

WHITEHALL AND VICINAGE.

THIS noble expanse, now extending from the National Gallery on the north, to Parliament-street on the south, is the most spacious, and, from its central position, the most important thoroughfare, or rather piazza, of the metropolis; and when extended as proposed, of equable width, as far as the Abbey, will open a view of ancient and modern public buildings of great effect, half a mile in length from Trafalgar-square. On the west side, after a range of twelve shops, important buildings continue the line to the corner of Great George-street, where the open church ground reveals the views of the Houses of Parliament, and Henry VII.'s Chapel, the Abbey, and St. Margaret's Church. First, is the Admiralty, with a frontage of about 300 ft. The façade of this building is not very distinguished in architectural effect, save its open dwarf colonnade, inclosing a court-yard, and a portico with lofty columns to its retired front of red brick; these ornamental features but ill accord with the rest of the fabric, which is something akin to Chelsea Hospital, or Hampton Court, a little modernised. The depth towards the park much exceeds the frontage, as there are grounds extending in the rear at least 300 ft. A red-tiled stable and an antiquated house, built on what, possibly, is called the garden, *front the parade-ground*, and are occupied by subordinates of the Admiralty, extending as far as the houses in New-street, Spring-gardens. The main body of the structure is, no doubt, capacious, but this department has much swollen since its first erection, and the lords have been compelled to acquire large detached establishments, and most expensive locations, too, in Pall-mall, Somerset House, Spring-gardens, and elsewhere.

Seeing that all establishments connected with so important a branch of the public service ought to be in propinquity with it, and that so palpable a site lies open at command, it appears strange that instead of renting offices at enormous rates suitable buildings have not been erected on their own ground. A building subsidiary to the Admiralty, if placed there, might correspond with the range of Foreign Offices on the opposite side of the parade-ground; the back windows of the existing building, although screened from a park view, might have sufficient reserves of light and air for ordinary officials; whilst the new structure would afford even better woodland views, and would also stand out to the parade,—thus affording scope for all the ramifications of the Admiralty. Our readers will remember plans for the union of offices on this site which have appeared in these pages.

Next in sequence on the Whitehall east street line comes the Army Pay-office, a stack of the old, quaint, packed description; it is about 100 ft. in frontage, without an obvious portal, but having two entrances, one at the end next the Horse Guards, practicated in the front wall and under the window line; the other through an angle or porch on the Admiralty frontage! The whole structure must be at least 250 years old.

The Horse Guards follows next in street line. This building was commenced in 1751, and was designed by Kent; its aspect from the park is certainly better than the complicated variation, or ornature, as some may call it, displayed on the frontage. It occupies a line of over 300 ft. along the pavement, and as this, too, is inadequate to the service in our times, perhaps the conversion of the Army Pay-office into a subsidiary department for the Horse Guards might be the best mode of redressing a necessity, and at the same time of adding a redeeming feature to the aspect now beheld from the banqueting-hall opposite.

The fine mansion of Lady Dover follows; the front hall, portico, and screen wall, filling up the distance of 140 ft. between the Horse Guards, and the new Privy Council Office, and extending rearward to the park.

In close juxta-position with Dover House, the Council Office completes the line, in a range of 315 ft. to Downing-street. As the interior of this Classic pile is vastly superior to offices of earlier foundation, so in architecturesque effect it far surpasses them, as also in solidity, internal adaptation, and finish.

The remainder of the street line from Downing-street to Great George-street will be occupied by the leviathan range of new Government and Foreign Offices, which are, as to the park frontage, now completed, nearly the whole way to Storey's-gate,—viz., to Charles-street. The façade to Parliament-street, which is to be widened to the Council Office line, will add fresh dignity to the continuous piazza.

On the opposing side of Whitehall there is but one public building of any pretension, but that one, the Banqueting House, gives importance to the whole range; and the Duke of Buccleuch's mansion and open court, together with Richmond-terrace, lend to it an unusual dignity.

It may be added, that Hubert de Burgh built the Palace of Whitehall, A.D. 1242, since which it continued to be the most valued site in London. Afterwards, in 1248, it became the urban residence of the Archbishop of York, until in the reign of Henry VIII., that monarch, A.D. 1530, erected a magnificent gallery, decorated by Hans Holbein, for the purpose of viewing tournaments performed in the tilt-yard, which occupied the present site of the Horse Guards and the parade-ground, the whole extent of St. James's Park being then open to view.

In the reign of James I., Inigo Jones was commissioned to design, A.D. 1606, a plan for a new palace, "in place of the old rotten sleight builded Banqueting House." The length was to have been 1,152 ft., and the width 874 ft. The plans were duly matured and drawn, but of the whole design which, if carried out, must have continued to be a lasting monument to the fame of the architect, the Banqueting Hall alone was erected.

There is a great blot on this vicinage,—the state of filth and waste of Scotland-yard, and the whole range between Whitehall-place, Hungerford station, and the Embankment. It has lain for many years in desolation, and must continue so until some decision is come to as to the intended bridge across the Thames, whether the piles and coffer-dams for three piers, which have impeded navigation for so many years, shall be removed, or the works carried out.

THE ARCHITECTURAL PUBLICATION SOCIETY'S DICTIONARY OF ARCHITECTURE.

WE are glad to believe that the completion of the Dictionary is now fairly assured.

A special general meeting of the subscribers was held at the House, in Conduit-street, on the 19th of January; Mr. T. H. Wyatt, in the chair.

Mr. Arthur Cates, the hon. secretary, read a report from the committee, which congratulated the members on the complete discharge of all debts and liabilities, and the possession of a cash balance of upwards of 150*l*., available for the prosecution of the Dictionary. The result of the exertions made to obtain new subscribers, so as to secure the completion of the Dictionary, was reported as having been attended with remarkable success, only sixty-seven names being now required to fill up the list; and as new adhesions were still coming in, the committee recommended the subscribers to authorise the immediate undertaking of the work of completion, relying on the continued exertions of the members to secure the additional subscribers still required.

The Chairman said he need trouble the meeting with but few observations on this matter. They all felt the great importance of completing this work which, as far as it had yet gone, had done great honour to the profession, though he felt in common with them all, that the great share of labour and responsibility had fallen upon two or three gentlemen. The work having gone to the length it had, it would be a great pity it should now lapse for want of a little individual energy on the part of the general body of the subscribers. Considering that in round numbers 100 new subscribers had been obtained since the annual meeting last May, it would be hard indeed if, in the course of the next twelve months, they did not obtain the additional sixty-seven required to complete the list. He would at once put down his name for an additional copy.

After some conversation, the following resolutions were then unanimously adopted:—

"1st. That the continuation of the Dictionary of Architecture be at once proceeded with in such a manner as to secure its completion at the earliest possible period.

2nd. That the hon. secretary of the Dictionary be requested to superintend, as before, the production of the text.

3rd. That the work as produced be issued,—

A. To all subscribers now on the list, whose subscriptions to December 31st, 1868, shall be fully paid up on March 1st, 1870. All in arrear at that date to be considered as having withdrawn, and will thus lose the advantage of obtaining the completion of the Dictionary of Architecture without further cost.

B. To all subscribers who may have paid up the fteen guineas in full, for which they will immediately receive all of the Dictionary thus far published.

C. To all new subscribers who, under special arrangement, are paying up gradually the subscriptions for past years, so soon as the payments made by them shall amount to fifteen guineas.

D. To all new subscribers who shall have elected to pay the subscription by instalment, so soon as their payments shall amount to fifteen guineas, they in the meantime receiving parts of the publication already issued, equivalent in value to the amount paid.

4th. That on each part of the publication be marked a price, calculated at rates, based on the cost, at which the preceding parts have been produced, at which price the parts may, at the discretion of the hon.-secretary, be issued to persons wishing to complete sets, and to whom the foregoing paragraphs do not apply.

5th. That this meeting pledges itself and the general body of the members, to use every exertion to obtain the subscribers still required, and to aid and support the committee and officers in carrying on the undertaking to a successful issue."

The Chairman said extraordinary energy had been displayed by three or four gentlemen since the annual meeting: as an instance of that he mentioned that Mr. Corson, of Leeds, had recently gained not less than eight new subscribers; and Mr. William Burn had used his influence greatly to the advantage of the society. Accessions to the list had also been made by the exertions of Mr. Abbott, of Sheffield, and Mr. Burnet, of Glasgow, Mr. Horace Jones, Mr. C. F. Hayward, Mr. D. C. Nichols, and many others. A little more energy in the early part of the present year, he was quite certain, would result in the completion of the subscription list to the point fixed upon; and he had no doubt the committee would have the pleasure of announcing before the next annual meeting that the list was complete. He was happy to say that several of the large builders and contractors had recently become subscribers, and in some cases a copy was subscribed for by the individual members of firms.

Several members having expressed the strongest hopes with regard to the speedy completion of the subscription list and the immediate continuation of the publication,

Cordial votes of thanks to the hon. secretary of the society (Mr. Cates), and the hon. secretary of the Dictionary (Mr. Wyatt Papworth), for their past labours and those which they had promised for the future, were passed unanimously.

Mr. Sydney Smirke said he could not allow the opportunity to pass without bearing his personal testimony to the great services rendered by the hon. secretaries. He had seen so much of them in this matter that he could truly say they had been the pillars of the concern, and their labours, intelligence, and constant and indefatigable exertions were beyond all praise, and he thought it was due from all present to thank those gentlemen in the strongest way they could.

A discussion ensued as to the means of expediting the production of the work and the mode of properly recognising the services of the hon. secretaries, and a vote of thanks to the chairman closed the proceedings. Friendly exertions are still required.

THE NEW EAST WINDOW IN CHRIST CHURCH, NEWGATE-STREET.

THERE is no subject upon which it is more difficult to pass a final judgment than upon a stained-glass window. No sure canons of criticism applicable to all styles have yet been fully accepted, by any appeals to which the capricious applause, or equally capricious abuse, of ill-informed taste can be silenced. How far is it allowable, or even expedient, to abandon a conventional for a naturalistic treatment? How far may perfect translucidity be sacrificed for the sake of pictorial effect? At what point does the picture executed in glass degenerate into a mere transparency? What modifications of treatment are rendered necessary when stained glass, whose birth-place was the Gothic cathedral, is transferred to a Renaissance or modern Grecian church? Such are a few of the reflections consequent upon an inspection of the new window placed in the eastern wall of Christ Church. Before, however, saying a word about the window itself, let us applaud the spirit which has led to its erection. We are delighted to hail one more instance of the intelligent interest which the guardians of our City churches now take, not merely in their preservation, but also in their adornment. Churchwardens and vestries vie with, often even urge on, the clergy in the path of improvement. Whatever may be the merits of this church window, let us give credit to the committee under whose auspices the work has been brought to a happy conclusion, to the liberality of the treasurer of St. Bartholomew's and Christ's Hospitals, and

to many of the chief parishioners. Nor must Mr. Hardwick go without a special word of praise for time and thought given to the cartoon.

The subject is appropriate in the church of Christ's Hospital,—Our Lord Blessing the little Children presented to him. The chief figure is seen issuing from beneath a richly ornamented gateway, on the sides of which appear in niches six of the cardinal virtues. On the one side, Faith, Hope, Charity; on the other, Justice, Fortitude, Chastity. In the mouldings of the arch are medallions containing the heads of the four Evangelists. The uncoloured glass (we cannot call it white) of which much of the architectural part of the design is executed is of value in partly redeeming the whole from its obvious fault —a certain sombreness of hue which prevails throughout. The central group is well composed, and, the legitimacy of the pictorial style on glass being admitted, its treatment is deserving of great praise. The figure of our Lord is majestic; the two apostles in attendance on our Lord, the women, and the children, prove that the artist has studied carefully, and profited by his study of, the old masters.

Our criticism would be suspicious if it contained no element of blame; and we do not, therefore, scruple to repeat our regret at the low key, so to say, in which the colouring of this central group is struck. We regret it the more because the window, except to a person standing immediately under it, gets none but reflected light. This aggravates the evil.

In saying so much, we would be understood rather as giving advice which may be profitably followed hereafter, than seeking to detract from the praise due to Messrs. Heaton, Butler, & Baynes for their principal share in the production of this window.

THE DRAINAGE AND WATER SUPPLY OF BUENOS AYRES.

A LAW empowering the Government to carry out a project of Mr. John Coghlan, M. Inst. C.E., F.R.G.S., for the drainage and other improvements of the city of Buenos Ayres, was recently before the legislature of the country, and there was every reason to believe would be passed. The scheme for water supply is nearly completed, although Mr. Coghlan has additional works to carry out. As for the drainage, Mr. Coghlan has gone upon the model of our great city drainage systems; and, indeed, he consulted Mr. Bazalgette and Mr. Bateman on the subject, as well as our own pages, of which he has made good use in his report to the local government.

He proposes a system of irrigation in connexion with the drainage, and points out the land proposed to be used for the utilisation and deodorisation of the sewage before it is allowed to pass into the river. He suggests the introduction of brickmaking and other approved machinery and materials, the erection of lime-kilns, &c., for the execution of the drainage works. The total cost of the drainage works Mr. Coghlan estimates at 598,746*l*. The total cost of the water supply, including the money still required to complete the works, to supply 3,000,000 gallons daily, is 164,000*l*., of which 55,000*l*., constitute the cost of the works already done. Street improvements, 178,571*l*., bring up the total cost to 941,317*l*.

THE EASTER ISLAND STATUES.

EASTER ISLAND, to which we have recently drawn attention,* was the subject of a paper at the Geographical Society on Monday night, read by Mr. J. L. Palmer, R.N., of her Majesty's ship *Topaz*. Mr. Palmer described the topography of this remote island in the South Pacific. As our readers know, it is in a part of the ocean far away from other islands, at a distance of 2,000 miles from the coast of South America, and 1,000 miles from the nearest Polynesian islands to the west. The island is entirely a volcanic formation, and presents numerous extinct craters, one of which yields gray lava, and another the red tufa, from which are carved the crowns or hats that formerly rested on the heads of the figures. The present inhabitants are only 900 in number. They belong to the Polynesian race, and have a tradition of their immigration from Opara at no very distant period. The interest attaching to the island was an ethnological one, and concerned the race who sculptured the vast quantity of stone images now existing *in situ* on stone platforms in various parts of the island, or inside large stone chambers or houses. The platforms, chambers, sculptures, and mural paintings were described by the author, but he did not propound any theory as to their origin. He stated that the inhabitants knew nothing of the matter; that they were undoubtedly of great antiquity; and that it was probable they were executed by a race who had long since passed away.

In the discussion which followed, Mr. Markham mentioned the fact of similar images having been found by the early Spanish invaders in the cities on the banks of Lake Titicaca, in South Peru, and belonging to the Aymara nation. There existed, however, this difference—that the Aymara images were profusely sculptured. Recently a stone platform had been found in one of the Pacific Islands, 1,000 miles to the west of Easter Island, at the bottom of a deep deposit of guano, and he threw out the suggestion that these were all relics of a very ancient people who slowly migrated across the Pacific from west to east. Mr. Franks gave in detail his reasons for concluding that the ancient remains in Easter Island truly belonged to an earlier population of the same Polynesian race who now inhabit the island. Sir George Grey also expressed the same opinion, and spoke of the habit of carving images as being a peculiarity of Polynesians, including the Maories, and that in a place where wood (the usual material) was very scarce, as it is in Easter Island, it was natural that stone should be substituted.

* See p. 10 for illustrations; *et ante*.

PRINTED OR WRITTEN.

Two students write,—Will you kindly inform us whether or not it is correct, in affixing the names by hand to plans in block letters, to speak of them as being *printed?*

*** It is incorrect, though the expression is common enough. If our young correspondents will recollect that the root of "to print," is *premo*—I press, they will see the reason why. To print is to form characters by impression.

ART-UNION OF LONDON.

IN the year 1868, the council of this society offered a premium for a series of partially shaded drawings, illustrating some work of a British author or events in British history.

Thirty-five sets of designs, of various degrees of merit, being sent in, the premium was awarded to a set of twenty, illustrating Canon Kingsley's story of "Hereward, the Wake," and these were found to be the work of Mr. H. C. Selous, an artist well known for his outlines illustrating "Pilgrim's Progress," his historical picture of "The Surrender of Calais," and for works from time to time exhibited on the walls of the Royal Academy.

The designs set forth many of the chivalrous deeds and hairbreadth escapes of the hero. He, "the last of the English," as the author calls him, betook himself to the fen country on our eastern coasts, when the field of Hastings had given England to William of Normandy, and there, with a band of devoted followers—a kind of prototype of Robin Hood and his merrie men—he for a long time set at defiance all the attempts of the king to capture or kill him. At length, after various turns of fortune, partly in desperation, and partly induced by kind messages from William, Hereward determined to go down to Winchester, and become "the king's man." He was received with much kindness and consideration, and lived for some time in great honour at court; but, ultimately, through the envy or jealousy of some of the Norman knights, a plot was formed for his destruction, and he was ruthlessly killed.

All these matters the facile pencil of Mr. Selous has depicted with much spirit and a great deal of fine drawing, though, as usual in such cases, there is not always the same amount of power displayed.

The work has been very faithfully rendered by the burin of Mr. C. G. Lewis, and the twenty plates, bound in a volume, will form the society's presentation work for the current year.

Whoever has read the story will certainly be anxious to secure these plates; and whoever sees the plates will want to read the work; while whoever pays his guinea for a ticket for this year's distribution, will certainly have more than his money's worth, independently of the chance of a picture or other prize. The advertisements announce that the volume will be out on the 1st proximo.

SCHOOL OF ARCHITECTURE.

WHILST the education of the architectural student is under consideration at the present time, it will, perhaps, be a matter of pleasant interest to some of the elder members of the profession to have recalled to them their past efforts in search of academical tuition; and to the students of the present day, the following recital of an attempt to gain that tuition, though unsuccessful at the time, may tend to give encouragement during their own efforts in the same course. It is very satisfactory to see that nearly all those whose names occur in the accompanying list raised themselves to eminence in the profession in London, or in the provincial towns where they subsequently established themselves. Only about ten of the then students are still alive. The originals of the four papers, formerly in the possession of the late Mr. C. H. Smith, are now preserved in the collection of the Royal Institute of British Architects.

WYATT PAPWORTH.

(No. 1.)

"No. 8, Bloomsbury-square,
February 25th, 1817.

Architectural Students' Society.

Resolved:—

1. That this Society have to regret that no public school has been formed in this kingdom for the promotion of architectural students' studies,—a measure highly necessary for the advancement of the art.

2. That the Royal Academy, being the establishment appointed for the promotion of the sister arts, painting, sculpture, and architecture, the Architectural Students' Society regard this institution as the parent of their art, and the most proper place for such a school.

3. That it appears to this Society, as the most probable method of attaining the desirable object, that it would be expedient that the architectural students of the Royal Academy in general should petition the president and members thereof, requesting them to form a school of architecture.

4. That the secretary is desired in the name of the Architectural Students' Society to write to the architectural students of the Royal Academy, enclosing these resolutions, and requesting their attendance (at a general meeting of the architectural students) in order to give their opinion and support to the same.

5. That as correct a list as possible of the architectural students of the Royal Academy be immediately procured, printed, and enclosed in the circular.

6. That the costs of printing, those attending the use of the room, and all other expenses incident to this business, be defrayed out of the funds of this Society.

LIST OF THE ARCHITECTURAL STUDENTS OF THE ROYAL ACADEMY.

Acton, —, Wilson-street, Finsbury-square.
Adams, Joseph, Portsmouth.
Ainger, Alfred, 22, Everett-street, Russell-square.
Aitchison, G., at Mr. Seward's, 39, Craven-street, Strand.
Alderson, James, Chelsea.
Alexander, Daniel, Greenwich.
*Alexander, D., jun., 3, Pier Head, London Dock.
Allason, Thomas, Westbourn Green Cottage.
Angell, Samuel.
Archer, Archibald.
*Bailey, George, 272, High Holborn.
Bailey, James, Paradise-row, Lambeth.
Bassevi, George, Rome.
Baxter, J.
Bedford, F., 8, Southampton-street, Bloomsbury-square.
Busby, Charles.
Brooks, William, 52, Doughty-street.
Clayton, Alfred B., Gray's-inn-square.
Cooper, John, 8, Phillips's Buildings, Somers Town.
*Donaldson, T. L., 8, Bloomsbury-square.
Doull, William, at R. Smirke's, jun. Esq., Albany.
Edwards, Francis, 8, Salisbury-street, Strand.
Elmes, James, Cambden-row, Somers Town.
Foyster, H. S.
Forbes, John, 15, Robert-street, Bedford-square.
Gardiner, J. B., Wormwood-street.
Gandy, P., Newman-street.
Garling, H., Little James-street.
*Goldicutt, John, Rome.
Habershon, —, at Mr. Atkinson's, 50, Bentinck-street, Manchester-square.
Hardwick, P., jun., Berners-street, Oxford-street.
Hakewill, —, 6, Lower Brook-street, Grosvenor-square.
Haycock, Edward.
Inwood, —, 3, Southampton-place, New-road.
Jones, John, Ireland.
Kinnard, W., jun., Rome.
Lane, William.
Leachman, John, 18, Rupert-street.
Lee, Thomas, Barnstaple, Devonshire.
*Lee, T., jun., 43, Devonshire-street, Queen's-square.

Legg, Gorge, 254, Oxford-street.
Lochner, William, 30, Coleman-street.
Malton, Charles, Burton-street.
Martin, Albinus, Gray's-inn-square.
Matson, C., at Mr. Hayes's, 12, Bedford-street, Bedford-square.
Mead, J. Clement, 34, Charlotte-street, Fitzroy-square.
Meikleham, R. S.
Merideth, M.
Maliphant, George, 44, Green-street, Grosvenor-square.
Nicholson, M. A., Titchfield-street.
Osborn, Robert.
Pain, G. R., 1, Diana-place, New-road, Fitzroy-square.
Paterson, Samuel, 4, Holborn-court, Gray's-inn.
Phillips, G., Wandsworth-road, near Vauxhall Turnpike.
Porter, —, at Mr. Chawner's, 82, Guildford-street, Brunswick-square.
Porden, W., jun.
Purser, William, 4, Bennet-street, Blackfriars-road.
Prittchett, Joseph.
*Smith, C. H., 5, Portland-street, New-road.
Smith, Charles, 9, Upper Seymour-street.
Taylor, T., jun., Wier-street, Richmond.
Thomas, M. E., 74, Margaret-street, Cavendish-square.
Turner, John, Shrewsbury.
Tyrrel, Charles, Guildhall-yard.
Upward, J. William.
Vulliamy, Lewis.
Wallace, Robert, 29, Leigh-street, Burton-crescent.
Willement, T., jun.
*Winckworth, John, 35, Upper Norton-street, Fitzroy-square.
Wyatt, Henry.

N.B.—Those who have an asterisk (*) affixed to their names are members of the Architectural Students' Society."

(No. 2.)

"No. 8, Bloomsbury-square, February 28th, 1817.

SIR,—In consequence of the enclosed resolutions, passed at the last meeting of the Architectural Students' Society on the 25th instant, I have to request that you will be pleased to favour the members with your attendance on Friday evening next, the 7th of March, at the Public Room, No. 65, Pall-mall (six doors from the British Gallery towards St. James's-street), in order to give your opinion and support to the same.

Free admission will be given on producing this letter, or your student's ticket, at the door. The doors will be open at half-past seven, business will commence at eight o'clock precisely, and at half-past eight the doors will be closed.

I have the honour to be, sir,
Your most obedient servant,
T. LEE, Secretary.

Note.—In consequence of the impossibility of procuring a correct list of all the Architectural Students of the Royal Academy, it is requested that those who may be written to will have the goodness to communicate the accompanying resolutions to such of their friends as are Architectural Students, and whose names or residences are omitted in this list, and request their attendance at the meeting; they will be admitted on producing their ticket."

(No. 3.)

"*To the President and Council of the Royal Academy.*

We, the architectural students whose names are hereunto affixed in behalf of ourselves and the other students of the Royal Academy, respectfully beg leave to solicit the attention of the president and council to this our petition, and humbly request that they will be pleased to take its prayer into their serious consideration.

Since the first establishment of the Royal Academy, instituted under the auspices of our most gracious Sovereign, for the promotion of painting, sculpture, and architecture, various schools have been formed for the improvement of the students in the several branches of the two former arts, from which they have received great and manifold advantages. We beg leave most gratefully to acknowledge the benefits which we also have derived from this institution, but we hope and trust the president and council will be pleased to extend to us in our art, advantages equal to those which the students of painting and sculpture in theirs at present enjoy; and, conceiving that it would not only tend to the advancement of the art, but would add to the reputation of the Royal Academy, we venture to petition the president and council that they would be pleased to form for their students a school of architecture, and allow them a further extension of the use of the library.

We presume not to offer any suggestions on the requisites for such a school, but leave it to the liberality and discernment of the president and council to render the object desired worthy the institution, and suitable to the dignity and importance of the art.

We trust that the president and council will be pleased to regard this expression of our wishes as joined with sentiments of the utmost deference and respect. Signed by ——"

(No. 4.)

"8, Bloomsbury-square, December 1, 1817.

SIR,—The members appointed by the Committee of Architectural Students to wait on Mr. Howard with the petition to the Royal Academy, have received the following answer of the President and Council, which I am directed by the Committee to communicate to you.

I am, sir,
Your obedient servant,
C. H. SMITH, Secretary.

'Royal Academy, July 19, 1817.

Gentlemen,—The petition of the Architectural Students in the Royal Academy has been laid before the President and Council; and I am desired to acquaint you that the President and Council, viewing it as a proof of the ardour which the Architectural Students feel in the pursuit of their art, have received it in good part, and will give it such attention as the general circumstances of the establishment will allow.

I am, gentlemen,
Your obedient humble servant,
(Signed) HENRY HOWARD, R.A., Secretary.
To Mr. George Bailey,
Mr. Thomas Lee.'"

ARCHITECTURAL EDUCATION AND THE DIPLOMA QUESTION.

NORTHERN ARCHITECTURAL ASSOCIATION.

THE president for the year of this association, Mr. T. Oliver, delivered his opening address at the last meeting. We print the concluding portion of it which relates to the subjects at the head of this notice:—

I am well aware of the difficulties, and even the disadvantages, that attend the establishment of an architectural diploma; but these, as in the case of both the legal and the medical professions, may readily be overcome, or even turned, as in the instances referred to, to the well-being of the profession.

This is not a new subject to me, and, therefore, I am prepared with the outline of a scheme for the occasion; and I base this scheme on the mode of procedure that was adopted in the enrolment of the legal and medical professions by the then governments of the country, and which occurred in this wise. About fifty years ago, the legal profession was in a somewhat similar position to our own, with this exception, that while any one could practise, it was necessary to be admitted on what was termed the "roll,"—a merely local matter, and quite a matter of form,—a sort of manuscript directory, indeed. On the application of the examination test, however, a serious question arose; and that was, What is to be done with the present practitioners? That question was soon settled on this principle,—all members of the profession whose names were upon the roll were admitted as attorneys, while all those seeking for admission had to undergo the examination.

In the case of the medical profession the same principle was applied as had been found to operate so successfully, only a few years previously, in regard to the legal profession.

In the year 1815 all persons in practice at that time became legalised practitioners, and could receive a diploma by merely applying for it; all subsequent practitioners to that time, however, were required to pass an examination at the Apothecaries' Hall, and latterly elsewhere at our medical colleges, universities, &c.

Now, my scheme for an architectural diploma is this:—Let the Royal Institute of British Architects obtain an enlargement of its charter, giving it power to bestow a diploma on all architects who are in actual practice,—as architects only,—not to architects and builders, not to architects and engineers, but to architects who practise architecture only,—say in the year 1870,—while all future applicants would be required to undergo an examination, graduated year by year,—say for three years, not longer,—the test-standard being advanced each year, until a thoroughly scientific curriculum was obtained. The details of this scheme could be filled up, as the details of those were which I have already mentioned, and which have been altered, enlarged, and improved from time to time as necessity and occasion appeared to require.

The only sound argument that I have heard urged against such a course is that it might prevent those who are qualified by undoubted genius for the profession, but who, owing to neglect in their education, were incapable of passing the ordeal of such an examination as would be required of them. And such a case is instanced of Kemp, the architect of that beautiful and remarkable monument of Scott, which is to Edinburgh what the Arc de Triomphe is to Paris. Such instances, however, are so rare that we are not called upon to legislate for them; and, besides, I question if the man who could produce such an immortal design could not easily work himself up through an examination; for genius is power of mind, and he who can devise great ideas himself can readily appreciate and learn the ideas of others. But admitting that he were not qualified, as in the case in point, he would have to secure the help of others in the event of any great success, as was actually done in this instance; for, if I mistake not, Professor Cockerell and other London architects were called in as consulting architects, and who not only greatly modified the construction of this structure, but also improved it in some esthetic respects. But just as bone-setters, hydropaths, quasi doctors, and others of the present day,—many of them doubtless men of decided talent,—evade the law in the public benefit, so could our genius do, and, under such circumstances, we should all be glad to see it done.

The advantages that would follow a diploma far outweigh the disadvantages, whether real or imaginary. A scientific and technical education would be the result; confidence would be increased, both in the practitioner and in the public; the public would have a control over "sharp" practitioners and empirics; the expulsion of the incapable and the unworthy would naturally follow; and last, though not least, the works of the architect, being designed and directed by educated thinking beings, would become works of art to "all ages and generations of men."

If we put our shoulders to the wheel, we may carry the diploma as rapidly as the events of the day are being carried on around us, whether we look at the Church or the State, or to our social reforms. This, probably, like many events of the present day, will be accomplished by a *coup d'état*.

The acquirement of a diploma necessarily implies a compulsory examination; an examination implies a certain amount of information; and a system of architectural education which will readily supply this information has yet to be established. And this can only be secured by the combined action of this Association with other similar bodies throughout the kingdom. Indeed, this is one of the great movements of the day; and for some years now this society, along with others, has been giving its attention to it.

Education is unquestionably a personal matter. matter. Every separate individual must acquire it for himself. There is no royal road to learning.

But the education I refer to must not only be general, but it must be technical. And here do not let us confound ourselves with terms. We are too apt to have floating ideas of the meaning of terms, and it is only when a forcible thinker or an eloquent speaker puts these ideas in plain language and logical form that we fully realise them; like many indistinct things, which, as by the light of a sunbeam, force themselves upon us when placed in plain and naked outline, and we wonder that we had never seen, though we had often *felt* them before.

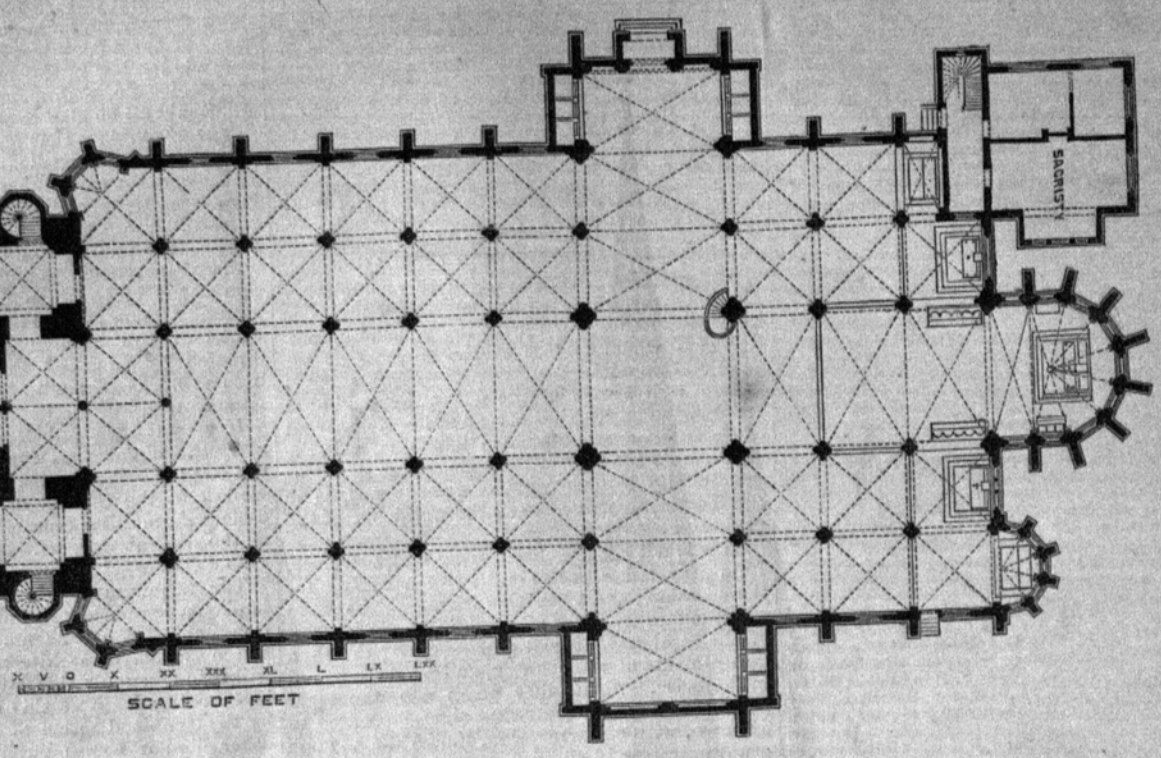
Now what do we mean by a technical education? The term "technical," Webster says, is that which is not in common or popular use. What, then, do we require that is not in common or popular use? What should an accomplished architect know?

Before referring to those subjects required to be known by an architect, and not in common or popular use, I must refer you to those that are. Writing is one, but how rarely it is good; spelling is another, and how seldom this is correctly given; and arithmetic is another. The English language, with a knowledge of Latin and Greek, and perhaps French and German, are the educational accomplishments now in common or popular use.

After the architectural student has acquired a good knowledge of English, he ought to apply himself to the study of language to this extent. Take the dead languages. He ought to have such a knowledge of Greek and Latin as would enable him to divine the meaning on architectural or archæological subjects, by the structure, origin, or derivation of the term. So much of our own language, and so many of the technical terms now in use, are derived from these sources, that it behoves the student to become tolerably conversant with them. Take the living languages. French and German are now the most in vogue, and for this, as well as for the additional reason that very valuable works in these languages have recently been published, he ought to become sufficiently acquainted with them to enable him, at the least, to read with fluency; and as travelling has so much to do in forming the taste and judgment, he ought to be able to make known his wants and wishes through these media.

Now for the technical. Premising that the architectural student necessarily becomes an accomplished geometrical draughtsman, and acquires an intelligent knowledge of the etiquette and routine of professional practice in the office of his principal, his special educational curriculum must embrace,—

First.—Drawing, in its more advanced forms, such as freehand, for the filling in of foliage



ST. BARBARA'S CHURCH, BREDA.
Plan.

and ornamentation; model or figure, for the arrangement and grouping of statuary and sculpture; perspective, for easy illustration of his daily duties; and "hand-sketch" drawing, for the sketching of buildings, mouldings, what are called "bits," and for help in rapid designing. Indeed, he ought not to rest satisfied until he can sketch a building so accurately as that the respective proportions shall be relatively the same as if laid down geometrically to a scale.

Second.—History: the history of architecture; of all architecture; of art generally, embracing the schools of painting, sculpture, and perhaps music, with the history of his own country in particular.

Third.—Mathematics, embracing a knowledge of algebra, geometry, mensuration, and general arithmetic. Practically, an expertness in calculating areas and cubes, squaring dimensions by duodecimals, and a capacity of applying algebraic or arithmetical formulæ, are about as much as the architect will care for carrying about with him, unless his forte lies in this direction. The mathematical and the artistic are so inimical, the one being the practical application of a rule, the other the inspiration of free, original thought, that I should not lay much stress on great proficiency here. An artist friend of mine never could add up pounds, shillings, and pence, but he had a remarkable eye for gorgeous colour. I do not by any means wish to undervalue this study. It is an essential portion of study, and like logic, if it teaches you nothing, it disciplines the mind.

Fourth.—Design. The architect must be able to express his thoughts in drawing, just as the author expresses his thoughts in writing. They are but different modes of communicating to others what we ourselves feel. No one can design until he understands certain esthetic laws; these laws, I confess, I am at a loss to express, they are so subtile. But they are seen in all works of art, are felt to be in nature, and are spontaneous and intuitive in the breast of the artist. This power, together with a knowledge based upon observation and experience, as well as that of book-learning and memory, will enable a man to design. A knowledge of the details of each style is, of course, essential to success; and the feeling above referred to is greatly enhanced by the study of executed works, in this and other countries, by travelling, and by discussion and reading.

Fifth.—Construction. A sound knowledge of construction is of the utmost value to the architect. Here, his mathematical attainments are called into operation; but as mathematical formulæ and constructional data are based upon experiments or observations amounting almost to facts, an experimental comprehension is of far more value, in the multifarious instances of ordinary practice, than a mere collection of formulæ, valuable as these unquestionably are. Now, to my mind, construction is best taught by lectures, and it is best taught by illustrations of failure. No man can correctly tell by abstract calculation what the thickness of a tower foundation wall should be, with given height and span, unless he is previously acquainted with the ordinary rules as applied in practical operations.

Sixth.—I must now group the remainder of the technical subjects required to be known by an architect, not in common or popular use, with just a word or two upon them. He must be acquainted with chemistry as applied to ventilation, sanitary matters, and certain classes of building materials; with geology, as applied to stone, clay, foundations, and also to certain classes of building materials; with acoustics, as applied to the relative sizes of lecturing and concert halls, churches, chapels, and other public structures; with mechanics, hydraulics, surveying, and levelling; with the principles on which valuations are founded; a knowledge of building materials in their application to specifications; and lastly, he ought to be able to take out the quantities of one of his own designs, for the sake of the essential good that the practice in doing so would do him for his lifetime.

Such are the technical studies to which an architect must devote himself under ordinary circumstances. But if he should have a forte for any particular branch of study, to this forte let him by all means direct his attention.

ST. BARBARA'S CHURCH, BREDA, HOLLAND.

THE new church of St. Barbara, in Breda, the opening of which we noticed in the *Builder*, vol. xxvii., p. 691, is one of the most remarkable examples of the revival of ecclesiastical architecture in Holland. The style chosen by the architect, Mr. Cuypers, is First Pointed, of that plain and rather severe kind so common in Belgium and parts of Holland. The plan of the church consists of a western porch; two western towers, flanking the nave; a nave of six bays, with four aisles; transepts, each three bays deep; a choir of three bays, also with double aisles; and a sanctuary of two narrow bays, terminating in a five-sided apse. The east bay of each of the four choir aisles forms a chapel, and has its separate altar. The high altar stands upon the "chord" of the great apse. The choir is fitted up with stalls and a rood-screen. There will eventually be three spires, two at the west end and one over the crossing of the nave and transepts; at present, however, the western towers are only carried up to a level with the apex of the roof of the nave.

The interior of the church is very striking, the whole building being vaulted, and the number of columns and arches seen at once give picturesque perspective effects.

A very remarkable feature in the interior of this church is the large triforium, equal in height to the arcade of the nave. This triforium is used as a gallery, and extends over the two inner aisles of the nave and chancel. Above this triforium is a clearstory, lighted with rose windows. It seems to us that this clearstory is scarcely important enough for such a large church; however, we must, in justice to the architect, allow that he could point to many ancient examples of churches in the north of Germany, where the clearstory is treated in the same way.

The whole church is built of brick, with the exception of the window-tracery, the columns, strings, &c., which are carved out of a stone called *Savonnière*. The steps and lintels of the doorways are of Belgian granite. The vaulting is filled in with brick called *Ysfelsteen*; the ribs are of stone. The cost of the shell of the building, exclusive of foundations, towers, and all carving or decorative work, was rather less than 15,000*l.* in English money. Of course, it must be remembered that materials and time are cheaper in Holland than in England. All the carving, the capitals, sculpture, &c., were executed in the workshops attached to the architect's offices at Roermond, and carried out from his own designs and under his direction. The same may be said of the stained glass and all other decorative portions of the building which could be executed separately.*

* In mentioning the opening of this church in our last volume we were led to call it St. Catherine's instead of St. Barbara's.

ST. BARBARA'S CHURCH, BREDA, HOLLAND.——MR. CUYPERS, ARCHITECT.

VALUE OF GROUND RENTS IN LONDON.

ON Tuesday last Messrs. Foster sold, at the Mart, freehold ground rents (for terms of eighty years), with reversion to rack rents, created by the Metropolitan Board of Works in New Southwark-street. They amounted to 2,505*l.*, and produced in twenty-seven lots 68,080*l.*, at prices varying from 26 to 33 years' purchase, or an average of nearly 27¼ years. We give the details of some of the lots:—

	Ground-rent.	
1 House, shop, and appurtenances, a few doors from Bear-lane, in the occupation of Mr. Baker	£30 0 ...	£780
2 Mercantile premises, on the south side of the street, near Gravel-lane	105 0 ...	2,750
3 Ditto, adjoining eastward the preceding	66 10 ...	1,730
6 Mercantile premises, in the occupation of Messrs. Waite & Co.	162 0 ...	4,540
7 Mercantile premises, adjoining the preceding, in the occupation of Messrs. Daniel Judson & Son	65 0 ...	1,860
11 Mercantile Premises, on the north side of the street, the corner of Essex-street	50 0 ...	1,360
12 Mercantile premises, adjoining the preceding	89 0 ...	2,430
13 Premises, adjoining the preceding, in the occupation of Messrs. Peter Lawson & Sons	108 0 ...	3,520
15 Mercantile premises, on the south side of the street, the corner of Southwark-square, in the occupation of Messrs. Joseph Hunt & Sons	90 0 ...	2,460
16 Mercantile premises, adjoining the preceding, part in the occupation of Messrs. Isaac Beer & Co.	75 0 ...	2,060
17 Ditto, on the eastern corner of Worcester-street	52 0 ...	1,450
18 Mercantile premises, on the north side of the street, in the occupation of Mr. W. V. Wright	110 0 ...	3,070
20 Ditto, in the occupation of Messrs. Dalton & Morgan	140 0 ...	3,690
22 Mercantile premises on the north side of the street, adjoining eastward the entrance to the testing-office of the Metropolitan Board of Works	75 0 ...	2,030
23 Mercantile premises, adjoining eastward the preceding, in the occupation of Messrs. Price, Dunn, & Co.	85 0 ...	2,400
26 Mercantile premises, Nos. 14 and 15, on the south side of the street, in the occupation of Messrs. Pattenden, Smith, and others, hop factors	165 0 ...	4,290
27 Premises of the Alliance Bank, the corner of Southwark-street	500 0 ...	12,850

MOTES OF MISCHIEF.

OLD readers of the *Builder* will not find anything very new in the leading idea of Professor Tyndall's important lecture on "Dust and Disease," at the Royal Institution, which has justly received much praise and attention. Take one passage written years ago:—

"How can the atmosphere—invisible, tasteless—convey these impurities? it has been asked. In the ordinary light which exists between the brightest sunshine and darkness, the atmosphere seems, so far as appearance goes, pure and harmless. When the sun shines, however, through narrow channels, into this seeming void, the motes in the sunbeam show that the atmosphere is anything but transparent: countless myriads of minute atoms of matter are constantly floating in the atmosphere, and entering the lungs of young and old. Here, then, is palpable evidence of the necessity for care. The semi-opaque nature of the air we breathe is evident; and far smaller particles, which the eye cannot see, are constantly rising from the surface and floating around,—germs of disease, emissaries of death.

In ill-paved streets and back yards in a similar condition, on which waste water is allowed to remain and saturate the soil, when the drainage from cesspools also further pollutes the earth, exhalations fill the air, and poison the system of those who are unfortunately obliged to inhale this important necessary of life so adulterated. Those who, in the cleanest and best-ventilated houses in the metropolis, have noticed the thick layer of dust that in one day covers tables, books, and the surface of every other object, can form an idea of the large quantity of these floating atoms which enters the mouth, both during day and night, at every respiration.

If the dust on the walls and floor of a room in which tobacco has been smoked be swept up, and then carefully packed away, on examination, after some time, it will be found that the tobacco-fumes are still detectable. Window hangings, carpets, and other fabrics will absorb the gases thrown off by tobacco, sulphur, and similar matter. In the same way the bad gases arising from overcrowded sleeping-rooms, or from drains, pervade and lodge themselves to a considerable extent on all surrounding objects, and poison those motes made evident to us by the sunbeam; and which, even when the bright sunlight does not make them visible, are still surely performing the never-ceasing work. Although in ships at sea, on mountain-tops, on moors and marshes, the motes, showing the never-ceasing operations of nature, glisten in the sunshine, there is a difference between the wholesomeness of such dust and that which arises in the houses of polluted courts, in the neighbourhood of crowded graveyards, in ill-ventilated assembly-rooms, overcrowded barracks, and other places. The particles of dust loaded with fever and contagion are readily borne upon the breeze from ill-conditioned and hidden places to those adjoining, and, of course, to a certain extent adulterate the better atmosphere. As an instance of the extent to which scents can be borne, it may be mentioned that when the wind has been blowing gently in the right direction, we have often distinctly identified, in Holborn and in parts of the City, the pleasant smell of the new hay from the meadows on the north of London. In like manner dangerous nuisances are floated on the air; and this circumstance, together with the sight of the motes in the sunbeam, ought to be a lesson to us that large masses of the poor cannot be neglected with impunity, and should teach us that it is necessary to preserve the atmosphere from pollution."*

GOSSIP FROM ROME.

A FRIEND writes from Rome:—

"Two days ago I went out to S. Paolo 'fuori le mura,' to see it in the midst of a lake about half a mile round the church. Of course it was not possible to get to the church, as the water was nearly 3 ft. deep. I do not yet know if the water got inside on to the beautiful pavement. My good patron, Cardinal Weld, made a successful effort to raise the floor 3 ft., so I shall be curious to know the result. Inundations are now damaging all Italy; Pisa and Florence are great sufferers.

The great Exhibition is preparing in the vast corridor of the cloisters of the Baths of Diocletian, Sta. Maria degli Angeli, where the cypresses stand. It is finely getting up;—an immense circular saloon, with compartments to the centre, where a 'piazzetta' is formed round the trees. This saloon must be of immense diameter, and is skylighted all round. As the Exhibition is to be ecclesiastical in all its objects, I cannot conceive how its vastness will be filled. The mile of corridor is for sculpture: works from the '*cinque cento*' to our time are to form the show. Vespignano is the architect; but the constant rain has almost suspended the work. Certainly everything this Pope does is splendid. The stained glass windows in S. Paolo are now complete, and are magnificent works of art, giving dignity to the building.

ST. LUKE'S WORKHOUSE.

THE Guardians of the Holborn Union have received the sanction of the Poor Law Board to their proposal for adapting the St. Luke's Workhouse to the purposes of a hospital and infirmary for the sick poor of the Union, and to the alteration of the workhouse in Gray's-inn-lane for the reception of able-bodied paupers. It is intended at once to erect a large block of building to contain 450 aged and infirm women at St. Luke's Workhouse, according to the plans prepared by the architect to the Union, Mr. Saxon Snell, and which plans have received the unqualified approval of the Poor Law Board.

The proposed buildings at St. Luke's are estimated by the architect to cost 14,000*l.*, inclusive of architect's commission, fittings and fixtures, and all other charges of every description. This estimate is at the rate of 27*l.* per bed for the hospital portion of the building, and an additional 2,000*l.*, if a basement story be added, as designed.

SIZE OF MORTAR JOINTS IN BRICKWORK.

SIR,—This subject may be considered in a variety of ways. First, if we consider that the strength and capability of sustaining weight will be increased by having thicker mortar joints than those commonly made, then it would appear probable that a building erected with mortar walls and without any bricks, would be of still greater strength; but we know that the mortar usually used would stand no such test. It therefore seems probable that thin joints would be preferable. But it may now occur to us,—then, why have joints of any thickness; or why should they be of a certain thickness, and neither less nor more? This will lead us to consider the properties of mortar and the duties it actually performs in brickwork, and to endeavour to discover how we can cause it to most effectually perform those duties.

Respecting its properties, it would be unsafe to consider that mortar is generally capable of bearing the compressile power that brick will bear, therefore the less of it we can manage with the better; but as thin, flattish pebbles will pass through a fine sieve, and may chance to lodge on edge when in a mortar joint, such would in too thin a joint cause the brick above it to ride, and the extra thinness of such joint would consequently be an element of instability instead of strength.

The duties mortar has to perform may be considered principally as two, viz., first, to be the means by which each successive course of bricks may be solidly bedded; secondly, to be the agent which shall enable each brick to bond with those beneath it.

We have already seen that it would generally be inadvisable to have thick joints, on account of any imaginary compressile superiority of the mortar over brick; we shall now see that joints as thin as they can with safety be made will also generally be desirable, when considered in their action, as the means by which "bond" is effected, for bond is the tying, as it were, of bricks by one or more bricks laid across and uniting them, and which is effected by means of the mortar placed between them, which, filling the inequalities of the bricks so placed, will, with a sufficient weight on the upper course, be the means of preventing the bricks in the under course from being dragged apart.

Then to consider whether thick or thin joints will more effectually achieve the bonding, let us consider the action of two stretchers bonding (in English bond) three "headers." If the joint in such case be made thin,—say ¼ in. thick,—then as the stretchers would bear 2¼ in. on each of the two outer "headers," and the bonding connexion between them would be the mortar under each end of the "stretchers," and in each case being in sectional area (taken parallel to the face of the wall) equal 2¼ in. by ¼ in.; then such would in the tearing asunder of the two outer "headers" be subjected to a compressile strain acting in a direction (nearly or quite) identical with a diagonal to the said area. Now, if we were to increase the thickness of our joint, then the length of the diagonal would also increase, and would consequently be unlikely to resist so great a strain as the shorter one, for the same reason that a long column will generally bear less pressure than a short one of equal diameter; also the angle of inclination of the shorter diagonal, being less than that of the longer, would give it an advantage over the latter.

But let us yet consider it in another way: if a ½-in. joint be stronger than a ¼-in. ditto, then why not a 1-in. also stronger than a ½-in., and a 2-in. than a 1-in., a 4-in. than a 2 in., an 8 in. than a 4-in., and so on? Let us consider an 8-in. joint, then our old sectional area of 2¼ in. by ¼ in. will become 8 in. by 2¼ in., the 8 in. being its height, and consequently the mortar connecting the ends of the "stretchers" with the "headers" will be easily cracked; and the "bond," in this case, show itself to be no bond in reality, as the strain would here be a tensile one, and which mortar would be unlikely to bear.

And again, if thick mortar joints be the element of strength, why should voussoirs, or arch-bricks, be cut or rubbed for the sake of strength? or, better still, why not have, as before, joints of, say 8 in. in thickness, or to gain the utmost strength arches of mortar altogether, no bricks being used?

HENRY AMBROSE.

THE clause enforcing thin mortar joints seems to me a relic of those classical days when every brick was required to be gauged to the same size, and all the joints tuck-pointed; and that when the architectural mind became emancipated, the battle of the styles was so hotly contested, that small matters of detail were overlooked, and in the routine of the office the clause has remained unchanged and unchallenged. With regard to the thickness of the joint, I am of opinion (without going into the chemical properties of mortar), that the thick joint is preferable if the mortar is good: the bricks generally used being of an absorbent nature, suck in a certain amount of moisture from the mortar, which moisture is necessary for its proper crystallisation: the thinner the joint the less resistance it can offer to the suction of the brick, and the less quantity of moisture it can afford to lose. The thick joint retains its moisture until the crystallisation takes place: it makes a greater allowance for the inequalities of the brick, and makes a much better bed in every respect. Another tradition of *olden times*, is the practice of rubbed and gauged arches: the arch, instead appearing as strong as, and part of, the surrounding work, has quite a cheesy effect, owing to the outer face and protecting coat being rubbed off. If our Gothic architects would try the effect of arches merely axed and set in cement, the character of many buildings would be much improved.

C. N. McI. N.

I VENTURE to say that where the joints of a piece of brickwork are of an equal thickness of a ¼ in. throughout, the settling of the work is

* "Town Swamps and Social Bridges." By George Godwin. 1859. In *Builder, ante.*

equal, and the joints being small, they do not bulge enough to do any harm. Whereas in a piece of brickwork where there are large joints, the settling of the work is unequal, and in consequence of the quantity of mortar, it causes the joints to yield to the weight above, which makes the joints bulge outwards: so that whenever it rains, the joints catch every drop that may trickle down the wall, which, in my opinion, causes a great deal of dampness in the walls.

A BRICKLAYER.

THE FATAL PANIC AT LIVERPOOL.

A TERRIBLE catastrophe has occurred in the Roman Catholic Chapel of St. Joseph, Grosvenor-street, Scotland-road, Liverpool, resulting in the death of sixteen persons, and injury to others. While a drunken man was causing confusion in the crowded chapel by vociferations about not stopping there any longer, some person unknown, whether by way of practical joke or otherwise, bawled out "fire," and a complete panic seized the congregation. A rush was made to doors and windows. It appears that there were large doors opening outwards, with printed directions to push them open prominently posted on them; but to these the panic utterly blinded the people; and one crowd from the chapel met another from a school in the same premises, where another congregation had been alarmed by the same idiotical cry of fire, the result being that many were thrown down, trampled on, and suffocated.

HERNE CHURCH, KENT.

ON Tuesday, the 18th, the chancel of the parish church of St. Martin, at Herne, was reopened after a rearrangement of the seats and fittings. Previously to the alterations, the chancel steps were very steep and awkward, and the floor had been brought to within 7½ in. and 8½ in. of the seats of the sedilia, although these had been raised about 4 in.; and though there were six of the old stalls remaining, these had been placed in such a position as to render them useless for their proper purpose of seats for those conducting the services. The floor levels have now been remodelled, rendering the steps of an easier grade, and bringing them into harmony with the sedilia, which have also been restored to their original height; the pavement being laid with Minton's red, black, and buff tiles, to pattern, in place of the old coarse red and black tiles in alternate squares. The old altar-table has been replaced by a new one of oak, with panels and tracery, and covered with an altar-cloth with embroidered super-frontal. Eight new stalls of oak have been carved similar to the ancient ones, and, with them, placed according to the original arrangement, viz., with three returning on each side at the west end of the chancel; and the old bench ends, with carved poppy-heads, have been reframed with new seats and backs. A new oak screen, with panels filled with tracery, has been placed at the entrance to the chancel. A fine organ (by Lewis) has also been provided. The alterations were carried out under the direction of Mr. Walter F. Dawson, of London, architect; and the wood carving was done by Mr. Adams, of Herne Bay.

KIND WORDS FROM THE LAND'S END.

WE find the following hearty expressions in the *Cornish Telegraph*. As a spontaneous outbreak of kindly feeling, we are tempted to quote it:—

"A firm grasp and vigorous shake of the hand, if they be cordial, are good at all times; but at no season can they be more fit than now, when mind and body, after a too brief season of rest, must be girded up for one more stage of life's journey. Distance, in these days, is no barrier to a prompt and hearty expression of good wishes; for electricity can speed a whisper with the suddenness of lightning, and the pen's utterances are conveyed hundreds of miles in a few hours. Moved thereto by its first article for the year 1870, we send our hearty good wishes to our contemporary, the *Builder*, from whom, for nearly twenty years, we have derived, week after week, something valuable in the way of art instruction or practical hint. For twenty-seven years our friend has laboured in the interest of those who plan and those who construct the edifices of the present day. Seeking to elevate and enlarge the views of the one class, and to advance the social and material position of the other, with intelligence so broad that the world is ransacked for all that may instruct; with heart so large that every kind of art and handicraft has its interests studied; and with eye so microscopic that no event within its sphere transpires, even in this remote corner of England, but the *Builder* sees it, no wonder that our friend is both prosperous and respected. For twenty-five years the present editor has been at work, and he says with perfect truth that if a right estimate of the labours of his coadjutors and himself be required, the volumes they have produced, and not a single number, should be glanced at. In this we fully concur. To take but one branch of editorial labour—the arguments and facts in favour of sanitary progress; the accumulated proofs that disease is dear and health invaluable; that the one may be averted and the other secured, to the heightening of human happiness and the prolongation of human life; and the plain rules laid down to attain greater comfort and more length of days;—and, even here, we find our contemporary's columns a mine well worthy exploration. There is, further, in this article, a passage or two peculiarly grateful to those who have Cornish industries at heart, not because the topic is our own, but by reason of its hopefulness and confidence in the future. We will quote it. * * * * * * *

And, in the hope that the *Builder* may continue to play a useful part in the future, we wish it good speed in the year 1870."

THE INDIAN GOVERNMENT AND THE CIVIL ENGINEERS.

IN the reply received by the Institution of Civil Engineers, Col. Strachey says for the Government of India,—

"It has been a subject of much regret to the Governor-General in Council, that serious misunderstanding of the intention of this notification should have arisen among civil engineers, both in this country and in England. His Excellency in Council, when informed that misconceptions had occurred, lost no time in issuing a circular order to explain the object and origin of the notification, and to assure the civil engineers in the service of the Government in India, that nothing had been further from the intention of the Governor-General in Council than to impute unworthy practices to the profession. A copy of this circular is annexed.

His Excellency in Council most fully accepts the declaration made by the Council of the Institution of Civil Engineers of the principles which are recognised by the profession in relation to the payments they receive for their services, and he desires to add that there has never been any doubt on the part of the Government of India on this subject, and that the notification specifically and exclusively referred to the receipt of commission which was a *legitimate* source of emolument, as being a recognised practice."

The Government made a very blameable misstatement, to which we early drew public attention, and have got out of it in the best way they could.

MIDLAND COUNTIES MIDDLE CLASS IDIOT ASYLUM.

SIR,—Kindly allow me space to say, in reference to this competition, that Mr. A. Waterhouse is now engaged in examining the designs, having been nominated consulting architect, by a large majority of the competitors.

The plans will be exhibited in the Athenæum Hall, Birmingham, on Monday, January 31st, and the five following days. Cards to view may be had from me.

W. G. BLATCH, Secretary.

A NOTE FROM TORONTO.

SIR,—I have been a constant reader of the *Builder* for many years, the numbers of which have so accumulated as to form almost a library of themselves. I am an old worn-out architect, and have retired to a snug retreat on the north shore of Lake Ontario, and look as regularly for my *Builder* every week as my Sunday's dinner.

The number for November 6th, 1869, was particularly gratifying to me, as it referred to Leeds Castle, in Kent. In 1822 I left London on a tour through Kent in search of employment, having a letter of introduction to a well-known barrister of the name of Scudamore, residing at Maidstone. He kindly recommended me to the gentleman in charge of the works at Leeds Castle, who employed me as timekeeper. I remained there but a few months, as I was a good deal annoyed by being always spoken of as the little Cockney.

I emigrated to Canada ten years afterwards, and was fortunate enough to gain the good opinion of the then Governor, Sir John Colborne, and most of the leading men in York (now Toronto). In 1833 I erected a villa for the Hon. C. Widmer, M.D., whose wife was related to the Martins of Leeds Castle. They were the only persons that I ever met who knew anything of that castle.

I was present with the four men when, on removing the last piece of the oak floor of the Queen's Wardrobe (described in the *Builder*); the chestnut oak girders, which crossed in the centre of the room, were so rotten that they broke with the weight of the men who were at work upon them. No bones were broken, but the men received frightful wounds on their legs by falling upon the points of the splintered oak flooring which stood upon end in the room below. I escaped by jumping into the recess of a window. I was also present at the erection of the temporary bridge across the moat for the conveyance of the *débris* of that part of the castle which was pulled down. I was also present when the moat was dragged, and a large pike caught, 4 ft. 11 in. long, weighing 28 lb. I had struck it with a hand-saw a day or two before, and when caught the mark was clearly visible.

I have requested my stationer to procure for me Mr. Martin's "History of the Castle."

As to "Bells of St. Mary's, Cambridge," page 969, of the 4th of December number, Southey tells that in the year 1796 the Cambridge Youths rang a peal of Bob Maximus in five hours and five minutes. It consisted of 6,600 changes.

This reminds me of a tomb in Leeds churchyard, erected to the memory of ten celebrated bell-ringers who rang for, I think, 38 hours without stopping. The whole account was quite legible on the tomb, for I read it forty-seven years ago; so fresh is it in my memory that I know the man who called the Bobs was over seventy years of age.

If one of your correspondents will gratify a garrulous old man by publishing a true account of the Leeds bell-ringers who have slept in Leeds churchyard for, I think, seventy years, most of your readers will be pleased, and none more than JOHN G. HOWARD.

Toronto.

P.S. I send you two views of the Toronto Lunatic Asylum, erected by me for the Government twenty years ago.

TENDERS: KITE'S-NEST FARM ESTATE, HASTINGS.

SIR,—In August last an advertisement appeared in your paper for tenders for the construction of roads, fences, &c., on the above estate, and for which at least five or six competent and responsible contractors from London submitted reasonable estimates, also others in the neighbourhood and from other parts. Tenders having been duly sent in at the appointed time, parties were then informed that the successful person would be written to, and others would see the result in the *Builder*. But such has not been the case, and for nearly five months no result could be known; but, after the lapse of that time, a person has been accepted, he not having submitted any estimate amongst the rest at the time invited for. However, such being the case—setting aside the length of time parties have been kept in suspense in knowing the result;—the expense, which was not a nominal one, to obtain all particulars, visit the place, make estimates, &c.,—I ask, is not this not only great injustice, but scandalous treatment, to put persons to the trouble and expense to respond to an advertisement for a mere nominal competition? Your giving this publicity will greatly oblige a few of the UNSUCCESSFUL.

THE HOLBORN VIADUCT.

WE have received a long letter from Mr. Richard Bell, to whom the chief premium was awarded by the Corporation for his design, in reply to Mr. Haywood's letter in our impression of the 27th of November last. The length of time that has elapsed justifies us in declining to print it.

FOREIGN LOANS—A MISTAKE.

YOU have done good service in warning the British public against that delusive investment in the sinking funds of *Foreign Loans*. There is an incredible amount in millions that has been lost in Spanish, Mexican, North American, and other State stocks. In one repudiating State, Indiana, the writer lost 1,500*l*. But nothing will warn the fools ever ready to "rush in."

A loan is now in the market for 12,000,000*l*., ostensibly for railways; but how know we but that this may furnish a hostile power with means of attack? At all events, these loans, on the first approach of difficulties, become well-nigh unnegotiable; and there must ever be the greatest amount of risk attending them.

Proper national works, undertaken on a sure basis and with care, should be fostered by our paternal Government, ever engaged in party squabbles.

The landowners will very soon be found coming forward offering land to railway companies if they will simply treble the value of that adjoining by running a line of railway through it. PAULATIM.

BARRACK ARRANGEMENTS.

A PAPER has been read by Dr. Stallard, to the Social Science Association (Mr. R. Rawlinson, C.E., C.B., in the chair), "On the Construction of Barracks in reference to the Physical and Moral Improvement of the Soldier." Dr. Stallard said that he had to lay before them some objections which he had offered to the Government against the principle upon which the most complete barracks are constructed, and to submit suggestions to insure comfort to the soldier, inducing a better class to enlist at less cost than at present. As a rule, commanding officers preferred the establishment of large barrack-rooms, to contain at least twenty-five men; while the soldiers themselves, tired of constant association with a number of their comrades, and, in fact, continual life in public, would like to be more private. Dr. Stallard drew attention to evil effects from the constant association of twenty-five or more men, in the absence of all privacy, and the difficulty of maintaining any high standard of discipline or moral tone among so many. As a rule, he believed it to be the case that one bad man was more likely to bring the whole down to his own degradation than a good man was to raise them to his, and he attributed to the constant and enforced association of the soldiers a great deal of their partiality for the canteen and the public-house. As a remedy for this state of things Dr. Stallard suggested that barracks should be constructed on the same plan as convict prisons, and so provide for each man a separate cell or apartment for his own use at night. Thus, let us here remark, the treatment of our soldiers, like that of our poor, would be more humane and proper if it were brought up to the standard of our treatment of scoundrel convicts. Dr. Stallard found, moreover, that the cost of barracks, as at present constructed, was not less than 60*l*. per man; whereas the cells of prisoners on the corridor plan cost only 18*l*. per man. He was convinced that the men as-

sociated with each other during the day would prefer to be private at night. The separate system would improve their health and morals, and would enable the officers to exercise a more strict supervision over individuals than could be practised under the present general system. In a discussion which took place on the subject of the paper, it was mentioned that partitions had been introduced with good effect in the sleeping apartments of public schools. The partitions need not necessarily be carried up to the ceiling; and it was generally agreed that, whether the corridor system was adopted or not, improvement in barrack accommodation is greatly necessary.

LADDERS FOR FIRES.

SIR,—With reference to the disastrous and fatal result of the fire at Richmond, one of the London papers states that "Mr. Lever, the manager, and Simpson, the clerk, were both at the windows, *calling loudly for ladders*;" and further adds, that, "Mingey, the cellarman, knowing there was a fifty-six-round ladder in the yard of the new hotel, got the two policemen present to go with him to fetch it, but their *united efforts* were *insufficient to remove it*."

Now, it appears to me the days of such antiquated and inconvenient ladders at present in use are gone by, and that ladders *light* and *portable*, composed of *tubular iron*, galvanised, might be economically constructed *in short lengths*, and fitted together, or taken to pieces in a few seconds, by *two persons*, at most; such ladders, in addition to general use, to be supplied to all hotels, in a similar manner as ladders are to the magnificent hotels in New York, viz., fixed from some of the top-floor windows in rear of the building, and reaching within 12 ft. from the ground. There may be some such ladder combining the qualities I have described, at present made in this country.

A SAFETY LADDER.

SEWAGE AND STRATEGY.

YOUR correspondent, "M. F. T.," has taken a wrong view of the subject referred to under the above heading,—viz., that the "Enemy" in advancing up the Thames upon London, could bung up our sewage outlet at Barking Creek, and thus poison London.

No city in the world has such a grandly organised scheme for the concentration of filth, and in the "weakness" suggested by your correspondent is our very safety.

The sewage of London, North and South, suddenly discharged upon an advancing fleet would inevitably produce a panic and a retreat, or death by poison.

We have to thank your correspondent's fears for the discovery of a new defence for the metropolis.

L. A.

HOLY TRINITY CHURCH, BARNSTAPLE.

THE new church of Holy Trinity, at Barnstaple, in Devon, has been opened by Dr. Temple, bishop of Exeter. The church was originally built in 1846, but owing to its defective construction, fell so quickly to decay that the whole of it, save only the tower, has been entirely rebuilt. The tower is a Perpendicular one, standing 130 ft. high. It was somewhat higher, but has been lowered some feet, and advantage has been taken of the scaffolding erected for that purpose to carve the blocks left for ornamental purposes at the time of its construction. The new church, which is cruciform, follows nearly the plan of the old walls; with an extension westward of a few feet, and eastward by the addition of an apse. The nave, instead of being as before, in one single span, with walls comparatively low, is now divided into three parts. The central part has lofty walls, forming a clear-story, into which the old nave windows are incorporated, with new hooded curtain-ribs on the inside. There are now narrow side aisles, with small two-light windows, separated from the nave by an arcade on either side, of Hatherleigh and Ham-hill stone, with moulded capitals. The chancel aisles are covered with double roof transversely, and there is a narrow aisle to these, connecting them with the nave aisles by transverse arches. The old roof timbers are reconstructed, and the carved angels are used again for the corbels, but the apsidal roof of the chancel is carried on small vaulting-shafts with carved capitals. The old pews are reconstructed into open benches, and the chancel is fitted with stalls. The chancel is laid with Minton's tiles. A memorial window in stained glass in the south aisle is from a design of the architect; another is in course of erection for the east window, by Messrs. Powell. In the west window some coloured glass is introduced. The stonework of this window is made of the old work, but reduced from seven lights to five. The contractors were Messrs. Hartnoll, Pulsford, & Cox. The carving of the tower was executed by Mr. Harry Hems, of Exeter. The architect was Mr. W. White, London.

LONDON CORN EXCHANGE COMPETITION.

As one of the architects invited to prepare a design for rebuilding the Corn Exchange in Mark-lane, Mr. John Whichcord found it necessary to address a letter to the committee on certain objectionable points in the conditions, especially as to the circumstance that while the selected architect's design would be rejected if it could not be carried out for an amount within 10 per cent. of the sum named (20,000*l.*), the light and air rights of adjoining tenants might lead to a large expenditure, if not prevent the building being carried out altogether. The committee removed one of the objections taken, but refused to make any arrangements as to the latter; and Mr. Whichcord therefore declined to compete.

Other competitors will do well to keep this question of compensations in mind.

NEW POLICE STATION, IPSWICH.

AT the Quarter Sessions held at Ipswich last week it was resolved that the designs prepared by Mr. W. Oldham Chambers, architect, Lowestoft, for the new police-station in Ipswich, should be accepted by the county, and the same were ordered to be sent by the Clerk of the Peace to the Secretary of State forthwith.

The arrangement on the ground floor gives accommodation for the Petty Sessions, with magistrates' retiring-rooms, attorney and witnesses' rooms, lavatory, and so on. At the rear of the above, provision is made for six cells, contiguous to which is the constables' sitting-room, coat-room, bedding store, and the usual offices. The superintendent's department contains parlour, living-room, kitchen, and five bedrooms, with infirmary for sick prisoners if required. The constables are provided with five bedrooms, reached by a separate staircase from that used by the superintendent. It is intended to commence the works immediately the plans are approved by the Secretary of State.

CHURCH BELLS AND CHANGE RINGING.

A LECTURE on this subject was lately delivered at the Bury Athenæum, by the Rev. J. J. Raven, B.D., head-master of Yarmouth Grammar School. The chair was taken by the new president, Lord John Hervey. The rev. gentleman, having introduced the subject, said there was no metal which would not give a musical sound in some shape or other, yet bells from the earliest times seemed to have been made of pretty nearly the same material—common bronze. At first, however, they were not cast, but hammered into shape, and of course nothing like music could possibly be got out of them. He was not certain when the casting of bells was first introduced into this country, but certainly before the Conquest. The present mode of casting was much the same as that made use of centuries ago. About the year 1000 there must have been a great many bells in England. There were no bells in this district, however, of very great antiquity. The oldest, perhaps, was one at Wordwell, a queer, long-shaped bell, with no date upon it, so that they could not judge correctly of its age. Some of the inscriptions on bells were very amusing; there was one on a bell, in Ickworth Church, made by a man named Pleasant, at Sudbury, which was rather a puff:—

"Henry Pleasant has at last
Made as good as can be cast."

Another was:—

"Henry Pleasant did me run
In the year seventeen hundred and one."

Some of the inscriptions were historically valuable, as, for instance, this:—"I was cast in the year of plague, war, and fire, 1666." In later bells the churchwardens' names were put in as well as the founders, but in the present time, he was glad to say, they got wholesome inscriptions, not superstitious invocations, such as "Praise the Lord," "Give thanks to God," &c.

CHURCH-BUILDING NEWS.

Aikton (near Wigton).—The old parish church at Aikton, which has recently undergone a renovation, has been re-opened for divine service. The old church is a very ancient structure, and appears to have been built upon the site of an edifice of still greater antiquity; but of the anterior church there is no historical record. The remains which still exist exhibit rather a good example of the Norman style. The present church, which is composed of a nave, aisle, and chancel, appears to have been built in the thirteenth century. Before the recent improvements the church had fallen into a deplorable state of decay. It was, in fact, a complete wreck, and was damp and unwholesome. The old oak beams of the nave had been covered, probably some century ago, by a flat-plastered ceiling only 13 ft. from the floor. The floor was flagged, and very damp; the pews were of a very unsightly description, and much dilapidated, while the pulpit,—a structure of a rather uncomely appearance,—was stationed in the middle of the nave. Modern windows, of by no means ornamental construction, in the nave and aisle walls increased the unprepossessing appearance of the place; while the whole of the interior, including the pillars between the nave and aisle, which were of good dressed stone, were whitewashed. All this, however, has now been changed. The church has been repewed with open benches placed on a wood floor. The passage has been flagged and the chancel floor has been relaid with ornamental encaustic tiles. The north and south walls have been rebuilt, and the old windows have been replaced by grouped lancet windows, in the style in which the church was originally built. An entirely new roof has been put upon the aisles; and in the nave and chancel the plaster ceiling has given place to heavy oak timbers, at an altitude double that of the previous ceiling. When the old roof was removed, a somewhat singular phenomenon was brought to light, exhibiting rather a curiosity in church architecture. All the tiles were fastened together with portions of the shank bones of sheep. The work of restoration has been carried out under the direction of Mr. Birkett, of Carlisle, architect. Mr. Pearson, of Wigton, had the joinering; Messrs. Roper & Beaty, of Dalston, the masonry; Mr. Wilson Bell, of Wigton, the painting and plumbing; and Mr. Joseph Fell, of Wigton, the slating.

Albury.—A full choral morning and evening service has been held at Albury Church, in celebration of the opening of the new organ and chancel. The new chancel has been erected at the cost of the Duke of Northumberland, and improvements in the nave, if not its reconstruction, it is expected will take place next year. The present improvement—that of the erection of a new organ, in a new chancel, with artistically designed roof,—is a step towards introducing church architecture in a purer form into Albury. The new chancel is from the designs of Mr. A. W. Blomfield. The windows are filled after designs by Lady Rokewood Gage. The three at the east are memorials of her ladyship's father, Mr. Henry Drummond. An oak screen separates the chancel from the nave. This, and the oak stalls, were made by the contractor for the whole work, Mr. Inkpen, of Abinger.

Bedhampton.—The Church of St. Thomas has been re-opened, after undergoing extensive alterations. The work was commenced about a year ago, when Mr. E. A. Gruning, of London, architect, after making a survey, reported that to carry out the repairs and alterations most necessary a sum of 650*l.* would be required for the repair of that portion of the church the expense of which would fall upon the parish. In June the contractors, Messrs. W. Moore, H. Carrell, and M. Osborn, of Havant, commenced the work of restoration. The walls were cleansed of stucco and pointed; a new bell-turret, a porch, and a new vestry were erected; the pulpit was removed, and its place supplied by a carved one of modern style; a reading-desk was provided; gas laid on in the place of the dips formerly used; and many alterations, improvements, and additions were made. The principal feature in the church now is a stained-glass window, presented by Messrs. F. J. Lightfoot and Richard Hewitt, of London, and executed by the firm of Lavers, Barraud, & Westlake, of London, the subjects represented being the Crucifixion and the Last Supper.

Maidstone.—The Free Church of St. James, Maidstone, a mission church in the parish of St. Paul, has been opened by license from the Arch-

bishop. The building is of brick, capable of holding 200 persons, all the seats being free. The walls internally are built of white brick, red and blue Staffordshire bricks being introduced in the arches and elsewhere. At the east end is a group of four lancet windows, the arches of which are supported by red shafts, having Bath stone bases and caps, the latter left in block for carving; the whole window being enclosed by an arch in red brick. The west end has a large circular window in the gable; and below it right and left are coupled lancet windows: between them is the entrance. The western gable end is surmounted by a bell-cot in Bath stone, in which is hung a bell cast by Messrs. Warner & Sons, of London. The church is warmed on a patent principle by a Gill stove sunk under the floor. The lighting is by gas, for which gaseliers have been designed in accordance with the style of the building, by the architect, Mr. Hubert Benstead, and they have been executed by Mr. Golding, of this town. The builder is Mr. Henry Bridge.

Asterley.—A new mission school church at Asterley, a small outlying hamlet of the parish of Pontesbury, has been opened. The church is a simple and unpretending structure of brick, built in the Early English style, and having an apsidal chancel. Its extreme length is about 60 ft., and its width 18 ft. The nave is divided into five bays marked externally by deep buttresses, and having coupled single-light windows in each, whilst the chancel has loftier single-light windows breaking up into the roof by gablets. At the western end a bell-cote, terminated by a wrought-iron cross, distinctly marks the character of the building; and the porch, of timber construction, occupies the westernmost bay of the south side of the nave. Internally the walls are left unplastered, and the warm appearance of the brickwork forms a variation to the usual whitewash. The roof is an open one. The chancel is formed by a raised step, on which is placed a perforated low screen of woodwork, behind which are seats for the choir, of a more ornamental character than those of the nave. Beyond the choir rises the sacrarium, elevated three steps above the nave floor. The sacrarium and choir are laid with Shropshire tiles, from Messrs. Maw's works at Benthal, and the central window of the apse is filled with a stained-glass window, having for its subject the Crucifixion of our Lord. The church is nominally constructed to accommodate only 125 persons, but 180 found sitting or standing room in it at the opening. The edifice has been built by Mr. R. Yates, of Shifnal, from the designs of Messrs. Paull & Robinson, of Manchester. The fittings, some of which are available for school purposes, were made by Messrs. Sidebotham & Co., of Manchester. The altar furniture was made from the architect's design by Messrs. Jones & Miller, of Birmingham; and Messrs. Edmundson, of Manchester, supplied the stained glass, also from the architect's drawings. The font is the work of Mr. Yates, the contractor. The site on which the church stands was given by Mr. Henry Gardner, of Westley.

Bawtry. — Harworth Church has been re-opened for divine service after restoration. Mr. C. J. Neale, of High Oakham, near Mansfield, was engaged as the architect. Plans having been prepared and approved of, the contract for the work was undertaken by Messrs. Robert Wood & Son, of Doncaster. The work includes the re-erection of the whole of the body of the church and the chancel, with the addition of two new transepts, each 17 ft. by 15 ft., a vestry, and an organ-chamber. The chancel arch and the arch at the entrance from the porch, from their being Norman in style, have been retained. The church has been built with wallstone obtained from the neighbourhood, and is dressed with ashlar stone, supplied from Ancaster. The tower is the same as before. The style of the previous building has been retained,—that of the Early Decorated. The floor of the chancel, and within the communion-rails, has been laid with encaustic tiles, supplied by Messrs. Maw & Co., of Broseley, Shropshire. As regards the interior arrangements, very little difference from the former church is perceivable, the old stalls, reading-desk, and pulpit having been nearly refixed. The church will henceforth be heated with warm water. The cost of the restoration has been about 1,450*l.*, most of which is already contributed.

Bristol.—For the proposed alterations in the Mayor's Chapel, plans have been prepared by Mr. Butterfield, architect, according to which it is intended to place the organ in the recess in the tower; by which means the general effect of the building will be more spacious. It is also proposed to make some alterations in the sittings, so as to move the "Red Maids," who now crowd close upon the altar-rails, further back into the building. The local *Times* hears it is contemplated to have large repairs and additions made to the organ, before it is re-erected. The cost of the whole, it is estimated, will not much exceed 500*l.* The matter will again be brought before the council before the plans are confirmed.

PROVINCIAL NEWS.

Baldock. — For a proposed town-hall for Baldock donations amounting to upwards of 800*l.* have been promised. It has, however, been resolved that a site shall not be purchased until 1,000*l.* have been subscribed.

Rickmansworth.—The completion of the new town-hall has been celebrated by a public dinner. The new building has been erected by a limited liability company (with shares of 5*l.* each) on the site of the old market-house, which had stood for many years in a most dilapidated and unsightly condition. The present structure is built in the Domestic Gothic style of architecture. The assembly-room is 56 ft. long, 27 ft. wide, and about 22 ft. high. It is well lighted, having five windows an each side. The roof is light, being a hammer-beam roof with an intertie of wrought iron. There are stone corbels supporting the roof, which will be carved when the funds permit. The artificial illumination is furnished by two sun-lights. The hall will accommodate 400 persons, or about 350 after deducting the space necessary for a platform and gangway. There is an ante-room at its southern end, and at its northern end a magistrates' room, nearly 30 ft. long, and about 15 ft. wide. In addition to these rooms, there are two other ante-rooms and a "cottage" for the hall-keeper to live in. The front of the building is of red brick and Bath stone, and over the entrance-doorway is a gable-turret, in which it is intended to place a clock. The cost of the erection has been about 1,200*l.* Mr. Arthur Allom, of Westminster, was the architect. The contract was divided between Mr. T. Holland and Mr. H. H. Hudson, builders, Rickmansworth. Mr. A. Allom was the architect of Lord's Grand Stand.

Hartshill.—The new buildings of the North Staffordshire Infirmary at Hartshill have been opened by the Duchess of Sutherland. The high sheriff opened the proceedings by presenting an appropriate address, to which her Grace responded in an able speech, in the course of which she said:—"I trust that I may be allowed earnestly to commend the claims of this house of mercy to the heart of every woman in this neighbourhood, who may have the honour of ministering, by her personal presence or otherwise, to its suffering occupants. I must also venture to express the hope that no feelings of sectarianism, arising from divisions among those who differ in forms only, may be allowed to weaken the unanimity required for the support of this charity. I will with the greatest pleasure convey to their Royal Highnesses the Prince and Princess of Wales the intelligence of the completion, under God's blessing, of the building, the foundation-stone of which was laid by his Royal Highness, and graced by the presence of the Princess, and the object of which is one that has always her tenderest sympathies.

Frant.—The Thompson Memorial Reading-room has been opened. It includes a residence for the schoolmaster and schoolmistress of Frant school. The building is erected as a memorial of respect and gratitude to the late Rev. Sir Henry Thompson, bart., the funds for which were raised by subscription amongst the parishioners of Frant. The building is situated at the back of the school, and is fronted with white bricks and red tiles, and is of that peculiar style of architecture which is usually seen on land belonging to the Earl of Abergavenny. The cost of the building is between 500*l.* and 600*l.*

Watford.—It is proposed to erect here an Agricultural Hall, by means of a subscribed capital of 3,000*l.*, in 5*l.* shares, and the sum of 2,200*l.* is already subscribed. The active agent in this movement is Mr. Alfred Sedgwick, the hon. secretary to the West Herts Agricultural Society.

Lewes.—The Visiting Committee of Justices propose that accommodation should be provided in the County Lunatic Asylum for fifty additional female patients, at an estimated cost of 3,600*l.* The plans and estimates have been prepared and laid before the Home Secretary.

York.—After the conclusion of business in the Corn Exchange on Saturday last, Mr. F. Carr said there was now a prospect of having a covered market erected in this city, as the corporation would apply for an Act in the next session of Parliament. There had been a great fight as to where the market should be placed. The site had been determined upon, but he heard with very great regret that there was a sort of opposition to having a covered market on that site at all. He, however, trusted that there were no persons, either in or out of York, who were really bent upon opposing this desirable scheme, considering that a covered market had been wanted for so many years.

East Retford.—The new Temperance-hall, in Chapel-gate, for the Band of Hope and Temperance Society, has been opened. The building was formerly used by the Exchange-street Temperance Society, but was bought by the Chapel-gate Society for 300*l.*, Messrs. Bellamy & Hardy, of Lincoln, were employed in the preparation of the plans for the alterations proposed to be made in the building, and under the direction of these architects the works have been carried out by the contractors, Mr. Liller, carpenter; Messrs. Bailey, gasfitters, &c.; and Mr. Pollard, decorator and painter. The main hall is capable of accommodating about 500 persons. The room is lighted by a number of statuettes placed round the wall, and each bearing two lights. There are a workmen's reading-room, committee and waiting rooms, one of which, behind the stage, can be turned into an orchestra at small trouble.

FROM SCOTLAND.

Bucklyvie.—The new waterworks, which have just been completed, at Bucklyvie, have been inaugurated. The village, till the present time, has been supplied with water from a brook which runs along by its side; but about two years ago a water company was formed. A spring on Upper Caithley Farm, from which the water is principally obtained, was measured, and it was calculated that the supply from it, amounting to 2,000 gallons in twenty-four hours, would be adequate for the demands of the population, which numbers about 350. The ground was surveyed by Mr. Alexander Malcolm, jun., Balfron; and estimates having been procured, it was seen that the supply might be obtained at a cost of about 150*l.* The capital was soon subscribed, in 1*l.* shares, by upwards of twenty shareholders; and the contract was undertaken by Mr. Archibald Merrilees, plumber, &c., Stirling. The contract embraced the laying down of 1,234 yards of 2½-in. cast-iron pipe, and 134 yards of 1½-in. pipe, the erection of wells, construction of cistern, &c. The water is collected from the spring which rises near Caithley Burn, and runs about 50 yards into the cistern; it is then conveyed through cuttings, in some places 8 ft. deep, down to the Culbowie-road, and into the village. The fall is considerable, and the pressure is good. It is thought that a water-rate of 1s. will amply repay the capital expended. Many of the residents have taken the water into their houses.

Books Received.

The Legend of Christian Art, illustrated in the Statues of Salisbury Cathedral. By the Rev. H. T. ARMFIELD, M.A. Salisbury: Brown & Co. London: Simpkin, Marshall, & Co.

THE statues in the external niches of Salisbury Cathedral have been restored, whether well or ill it is unnecessary for our present purpose to say; and Mr. Armfield, who is a minor canon of Salisbury, observing how few amongst the multitude of spectators who gaze upon them were able to identify any but the most familiar of the figures, has written this little book for their elucidation. Inasmuch, however, as these figures represent some of the most famous saints of Western Christendom, the volume has a wider use, and may be regarded as a useful handbook for architects and others engaged in ecclesiastical art, as well as for visitors to galleries and cathedrals at home and abroad. Many of the latter certainly lose much of the interest hidden in what they look at through want of such information as is here set forth. Husenbeth's "Emblems of Saints," which, though useful as a pocket companion enabling tourists to identify saints, does not give the reasons why particular emblems have been assigned to them, shows how

large a number of personages whose effigies occur are not mentioned by Mr. Armfield. Still his book is useful as far as it goes, and those who want fuller information on the subject may consult Père Cahier's book, "Les Caractéristiques des Saints dans l'Art populaire, énumérées et expliquées." The "Legenda Aurea" (Golden Legend) and Mrs. Jameson's "Sacred and Legendary Art" have, of course, supplied Mr. Armfield with much of his information. The legend of St. Osmund, the originator of the "Use of Sarum," is taken from a Latin MS. in the British Museum, which the author believes has never before been printed. Of course, we do not ask our readers to believe all these tales. Mr. Armfield says on this point,—

"Our own attitude towards these legends, whether as writers or as readers, I could wish not to be mistaken. It is, of course, no part of my present business to establish or defend them. But one thing about them will be admitted by all. Although from the change in the modes of European thought and feeling, which the critical spirit of modern times has introduced, we may smile at the extravagance, the disregard of all the laws of incident everywhere discernible in these Mediæval legends, yet it is impossible for any thinking man not to read in them the history of processes in the inner life which are being continually reproduced within the compass of our own individual experience; impossible not to recognise in their details the features of exalted ideals of character, a unity of lofty purpose and an heroic devotion to duty, which will to the last command the admiration and the sympathy of mankind."

Construction of Hospitals. By DOUGLAS GALTON, C.B., F.R.S. London: Macmillan & Co. 1869.

OUR readers will remember that Captain Douglas Galton read an address on the general principles which should be observed in the construction of hospitals before the British Medical Association in Leeds. This he has now wisely published, with illustrations and a report of the discussion that followed the reading. A full account is given, as appendix, of the ventilating fire-place, founded on General Morin's experiments. We take exception to Captain Galton's observation in the preface, suggesting that improved hospital construction is to be dated from the Report of the Royal Commission on the Sanitary State of the Army of 1857. But we may have another opportunity to look to the address generally.

VARIORUM.

"ADDISON'S Essays from the *Spectator*," as just now issued by Tegg, make a volume of enduring value and interest. Addison, as an essayist, has long influenced society, and will continue to do so; and it was a good thought to bring his work together in a compact form, cleared from inferior matter. It is unnecessary in this place to inquire if the editor has not included some few essays by other contributors to the *Spectator*. The object of the volume is not to settle what Addison did and what he did not write: here, at any rate, we have the great bulk of what he contributed to that famous serial. ——The January *Quarterly* is good and varied. An article on the Land Question in France will pay for attention, especially at this moment. The Laureate gets but scant justice at the hands of the reviewer of "The Holy Grail." Mrs. Stowe's "Vindication" is rightly knocked about. —— "Hints on Sanitary Reform; with a Plan for the Disposal of the Sewage and Débris of Glasgow. By James Gray, M.D., and Robert Baldie, Architect. Glasgow: Cairns & Co." The authors of this pamphlet propose to convert the sewage and *débris* of Glasgow into artificial guano, and purify the Clyde by a scheme of drainage and conveyance through intercepting sewers down the river banks on both sides as far as Newshot Island, where tank pond and other works would be used in converting the sewage into artificial guano, the purified water being allowed to pass there into the river. As many as twenty different schemes for disposing of the Glasgow sewage have been projected within the last ten years. —— "Prison Discipline, with some Suggestions for its Improvement." This is a letter addressed to Mr. Henry Pownall, chairman of the Middlesex magistrates, by Mr. A. Angus Croll, J.P., late high sheriff of the city of London, &c. The author takes our side of the question; urging the useful employment of prisoners. He says,—

"I feel a strong aversion to the costliness of our present system. The plan which I propose would, I think, bring with it a very great saving of expense. Why should the mass of skilled and unskilled labour within the walls of our prisons be almost entirely unproductive? Might it not be employed so as to produce some return? I cannot but think that something might be effected. I feel sure that something ought to be attempted, in this direction."

He proposes to extend and develope the principle of employing prisoners in their own trades, —a principle, as he observes, already to some extent in operation. He would only keep them above starvation point, leaving all beyond that to their own exertions and wages:—

"All I contend for is that a true system of prison-discipline should include the following points:—

1. That in the classification of prisoners they should be grouped according to their trades and professions, each man following his own proper calling, and receiving better or worse accommodation in proportion to his earnings.
2. That if a prisoner will not work, neither shall he eat, except the poorest fare and in the scantiest quantities.
3. That all beyond this shall be dependent on the man's own exertions.
4. That a contribution be levied upon the proceeds of the convict's industry in payment for the rations provided by the prison authorities.
5. That an adequate motive to work be provided, and that the motive be of the same kind as that which actuates those who are at liberty."

—— "A Chart of Industrial Life, with some Instructions for its Use. London: Simpkin & Marshall." The word "chart" is here used as a figure of speech relating to the avoidance of obstacles and dangers in industrial life:—

"To sum up," says the author, "intelligence and goodness of disposition are indispensable qualifications to enable mankind to enjoy well-being in its highest form. Without real education extended to all children, these qualifications will not prevail among adults. And since children cannot provide education for themselves, all adults who are not indifferent to the happiness and improvement of society must lend their aid to have it provided for them. If this be true, the neglect and misdirection of education in times past fully account for the number of destitute and miserable to be found in every country. And if similar neglect and misdirection are persisted in, the number of destitute and miserable among us will remain undiminished.

Parents in some countries expose or kill their children. In others, they passively permit them to grow up ignorant, vicious, and miserable. The latter condemn the former for their cruelty, their barbarity. The retort of the former is frightfully crushing. Let it be our endeavour, while we keep free from the guilt of destroying our children, not to deserve their reproaches for suffering them to live."

Miscellanea.

Completion of the Liverpool New Exchange Buildings.—The reconstruction of the Exchange Buildings, of which a view and description have already appeared in the *Builder*, has now been completed. The present quadrangle, like its predecessor, is surrounded on three sides by an arcade, but, unlike the old one, the new arcade stands before the building, except at each end, where it is terminated by a *pavilion*, and in the centre of the north wing, where it passes under the principal tower. The architectural effect of the new building is very different from that of the old: the latter partook of the Palladian character of the town-hall. Outside the quadrangle, in the streets which bound the property of the company, the exterior of their buildings has greatly improved the aspect of this part of the town. In Exchange-street East the alignement of the property has been altered, so as to bring that front into range with the Liverpool and London Chambers, and the turret at the corner of Tithebarn-street forms an agreeable termination to the view from Dale-street. At the foot of this turret, as in Tithebarn-street, Chapel-street, and Exchange passages, east and west, various other improvements have been effected, whereby the convenience of the public and the appearance of the buildings have been promoted. The architect of the new edifice was Mr. T. H. Wyatt.

Great Strike of Workmen in France.—A general strike took place recently among the workmen at the iron-works of M. Schneider, the president of the Corps Législatif. About 10,000 persons at Creuzot left off work. The origin of the strike had to do with an offer spontaneously made to the workmen by the manager to leave to the men the direction of their own savings-bank: it had nothing to do with wages. The strike commenced first in the building workshops, whence the leaders proceeded to the forges, furnaces, and mines, where they successively induced the men to join the strike. The strike, however, seems to have ceased as suddenly as it occurred.

Death of Mr. Broome, of the Temple.—We regret to hear of the death of the celebrated gardener of the Temple, Mr. Broome, whose crysanthemums and pompons are so well known to the citizens. The readers of the *Builder* were among the first to have their attention drawn to Mr. Broome's merits. He published a book on his favourite flowers which he did much to render popular; and the Londoners were greatly indebted to him for the floricultural improvement of their squares and open spaces.

The Approaching Census. — Dr. Begg urges, as we did previously to the last census, that information by its means should be obtained respecting the state of the houses of the people. This was done in regard to Scotland at the last census after some difficulty, and it would be most valuable with reference to many social questions if similar information could now be secured for the United Kingdom. The points ascertained in regard to Scotland were the number of rooms in each house, the number of persons in each family, and whether the houses had or had not windows. The following was the curious and instructive result for all Scotland:—Houses without windows, 7,964; houses of one room, 226,723; houses of two rooms, 246,601; houses of three rooms, 75,933; houses of four rooms, 37,186; houses of five rooms, 19,910; houses of six rooms, 15,278; houses of seven or more rooms, 37,191; total houses in Scotland, 666,786. The full details were given at the time also in a tabulated form in regard to Edinburgh and Glasgow, and are not only very instructive, but have given a great impulse to social and sanitary improvement in these cities. If similar details were now given for every city and town in the empire, and if they were continued every ten years, we should not only lay a solid basis for social science in regard to disease, pauperism, and other evils, but we should be able to compare one town with another, and from time to time the kingdom with itself.

Metropolitan Fire Brigade Statistics — The report to the Metropolitan Board of Works of the chief officer of the Metropolitan Fire Brigade has been printed. From this report it appears that 1,784 calls were received during the past year; that 120 were false alarms, 92 chimney alarms, and 1,572 calls for fires, of which 199 resulted in serious damage, and 1,373 in slight damage. The fires of 1869 show a decrease of 96 compared with those of 1868; but compared with the average of the last ten years there is an increase of 230. These lists do not include trifling fires or chimneys on fire. The energy and activity of the firemen are shown by the fact that amongst the brigade of 378 firemen there were 102 accidents from contusions, wounds, sprains, burns, &c. Amongst causes of fires prominent places are held by the candle, the lucifer, tobacco, the fire-spark, the airing of linen, defective, foul, and blocked up flues, gas-escapes, and swinging brackets, paraffine, stoves, &c. Out of 1,572 causes specified, the candle is set down at 202, the fire-spark at 133. The next is 45 from smoking tobacco, and gas-escapes and flue fires follow next in order.

St. James's Church, Aldgate. — At a meeting of the City Commission of Sewers on Tuesday last, with reference to this church, of which the members of the Court of Common Council are the patrons, information was given that the edifice was in such a dangerous condition that no services could be performed in it, and that no funds were in hand to restore the fabric. Mr. John Young, the district surveyor, had reported that the arched ceiling over the entrance to the church had sunk, and was in a dangerous state, that the external walls were fractured, and were also dangerous; that the pillars were broken and decayed; and that the belfry windows likewise required repair. The expense of shoring up the church was reported at 25*l.* or 30*l.* The necessary steps were thereupon ordered to be taken. A letter on the subject has been written by Mr. Daw to the town clerk, with a request that it might be brought before the notice of the Common Council. With them rests the question whether the structure shall be restored or not, or whether the amalgamation of the benefice with the adjacent one of St. Catherine, Cree shall be effected.

Free and Cheap Steel for Rails, &c.—It is expected that the approaching expiration of Mr. Bessemer's patent for converting pig-iron into malleable iron, and that again into steel, without any additional consumption of fuel, will tend in a considerable degree to the future safety of railway passengers. The patent will come to an end in February, and as a result, it is expected that steel rails, which have hitherto been almost too expensive to be used, will fall to a price a very little above that of the best iron. The projectors of new street tramways now will, no doubt, avail themselves of this material. Mr. Bessemer first communicated an account of his process to the meeting of the British Association at Cheltenham in 1856.

New Cemetery for Bingley.—In accordance with a notification given to the newly-formed burial board for the parishes of Bingley and Holy Trinity, Mr. P. H. Holland, of the Burial Acts Office, Whitehall, has visited Bingley for the purpose of inspecting the site of the proposed cemetery. Mr. Taylor (of Taylor & Garthwaite, architects and surveyors, Bradford, who are instructed to prepare plans for the laying out of the cemetery), and several other gentlemen, members of the Board, and ratepayers, attended. The site of the cemetery is at the north-west end of the town, and consists of ten acres of rising and undulating ground, which have been purchased for 3,500*l*. After Mr. Holland had gone over the ground, a meeting was held in the Mechanics' Institute, but no formal objection was submitted; and the vicar, although he disapproved of the entrance to the cemetery being formed so near his residence, stated that he should not oppose the public convenience. A resolution requesting Mr. Holland to recommend the Home Secretary to approve of the site was then unanimously adopted.

Archæological Discovery.—An interesting discovery has just taken place at Tolethorpe, near Stamford. Whilst excavating in the grounds of Mr. Charles Ormston Eaton, the workmen came upon the foundations and other remains of an ecclesiastical building of the fourteenth century. In Blore's *Rutland*, we find it recorded that "Before the year 1300, Sir John de Oketon and Alice his wife, presented a clerk to the church of Little Casterton; but whether they were owners of the manor of Tolethorpe I have not been able to discover; it is probable, however, that John de Oketon is the same person with John de Tolethorpe, who in the year 1301 founded in Tolethorpe an hospital for seven poor men, and a chantry for the benefit of his soul." The writer adds, "all the inquiries I have made relative to the chantry of Tolethorpe have not procured for me the least information as to the site of the chapel or other places of worship, of that religious foundation."

Rotherham Hospital and Dispensary.—The foundation-stone of the proposed hospital and dispensary at Rotherham has been laid with Masonic honours by the Right Hon. Earl de Grey and Ripon, K.G., Lord President of the Council, Deputy Grand Master of England, and Provincial Grand Master of the West Riding. In the selection of a suitable design for the new building, the successful competitors were Messrs. Mallinson & Bakewell, of Leeds. The contract was let to Messrs. Askew Brothers, Parkgate, for 4,680*l*. The Tudor style of architecture has been adopted. The total length of the building will be 260 ft., and the breadth from front to back 180 ft., each department occupying a separate block, and being entirely isolated. The principle of isolation will, in fact, be extensively adopted throughout the building, while each ordinary patient will be allowed 2,000 cubic feet of space, and those of the special wards, 2,500. The total sum subscribed and promised is upwards of 6,000*l*., which will about meet the probable cost of site and buildings; but about 2,000*l*. more will be required.

Premiums for Odours.—As an encouragement to colonial flower farmers, various premiums have been placed at the disposal of the council of the Society of Arts, for the term of seven years, by Dr. Septimus Piesse, F.C.S., including 5*l*. for one pound of Otto of Bergamot, of the value of 16*s*. or more in the London market, being the produce of plants (*Citrus bergamia*) grown in Australia, New Zealand, Natal, any of the British West India Islands, or any other British colony or dependency; 5*l*. for one ounce of Otto of Roses, of the value of 20*s*.; and 10*l*. for a canister of enflowered butter or fat, scented with any kind or sort of flower,—all the product of the same colonies.

Poor-rate Valuation Lists.—A Poor Law Board return for 603 of the unions in England and Wales shows that in April the valuation lists had been completed in all but ten of them. The amount as settled by the assessment committee, in the valuation lists last approved, of the gross estimated rental, was 95,974,617*l*. The amount of rateable value on which the contribution to the common fund was calculated at Lady-day, 1868, was 79,790,257*l*., being about four-fifths of the rateable value of the whole of England and Wales. The expenses incurred by the committees in the year 1867-68 amounted to 35,176*l*., and in 1868-69, 32,767*l*.

Earthquake-proof Churches.—A Philadelphia letter in the *Times* says:—The people of California, since the earthquakes of 1868, have a great dread of recurring shocks. We have intelligence from San Francisco that the Roman Catholics are building there "an earthquake-proof church." The side walls above the basement are only 30 ft. high. At this height a roof rises, which, with the main roof, is supported independently of the walls by two rows of pillars inside of them. Both roofs are firmly bound to the pillars, and the pillars are fastened together by iron cross-beams, secured with heavy iron bolts, forming a network of great strength. The theory of the plan of construction is, that should the pillars be shaken down, the roof would be launched off outside the walls, instead of falling inside, thus giving a chance of escape from the ruins. In thus falling, the roof would be carried aside a distance of 80 ft., the length of the pillars.

The Decoration of Rudford Church.—The decorative work has been proceeding under the hand of Mr. Meek, of Kingsholm, Gloucester, directed by Mr. Gambier Parry, and at the cost of Mrs. and Miss Price, who gave the organ. This decorative work is now finished. The base of the walls is chocolate, with cream colour above. The mouldings of the chancel arch, with its dog's-tooth ornament, are picked out in various colours; the organ-front showing beyond the arch. There is diaper work at the east end, with the sacred monogram in gold; and the chancel shows a blue firmament, powdered with gold stars. More colour has been added, and texts have been painted around the walls and over the chancel arch and communion-table.

Memorial Tomb in Abbot's Leigh Churchyard.—In this churchyard there has just been erected a tomb in memory of the late Lady Miles, wife of Sir W. Miles, bart., of Leigh Court, and of one of their children. The design was furnished by Mr. Pope, architect; and Mr. Pavey, marble mason, Clifton, has executed the work. The tomb, as described in the *Bristol Times*, consists of a red Mansfield base, with chamfered gray plinth, surmounted with a red granite mitre ledger, with an elaborately-carved marble cross lying in relief on the ridge. At the head and foot of the tomb stand two ornamental crosses, different in character, on a red granite plinth. The whole is surrounded by a stone edging, enclosing an area of about 10 ft. by 8 ft., with a low ornamental railing.

Proposed New Corn Exchange for Doncaster.—It has long been contemplated by the town council of Doncaster to erect a new Corn Exchange adjoining the present Market Hall, and in close proximity to the Cattle and Wool Markets. The question was again mooted at a council in committee. Mr. Watkins's plans were again brought under consideration; and after considerable discussion, it was agreed that Mr. Watkins, of Lincoln, architect, be instructed to prepare estimates, in accordance with his amended plan, of the cost of the proposed new Corn Exchange and south-east wing, and submit them to the council without delay.

Presentation of a Testimonial to the Ex-Borough Surveyor of Penzance.—We observe, from the *Cornish Telegraph*, that a public recognition has been made in the town-hall of the services of Mr. John Matthews, who has lately, from ill-health, resigned the borough surveyorship of Penzance, which he had held during the space of a quarter of a century. A purse of 500 sovereigns, a massive silver salver, and a parchment bearing the best good wishes of a host of friends, were offered to him on his retirement from the more active and laborious duties of his office. The salver bears this inscription:—

"Presented to Mr. John Matthews, with a purse of 500 sovereigns, by the corporation and inhabitants of Penzance and the neighbourhood, on his retirement from the office of borough surveyor and engineer. This testimonial marks the high sense of public respect and esteem for his integrity and ability, during a period of twenty-six years. 14 January, 1870."

Destruction of a Statue about to be Cast in Bronze.—The sculptor Marcello—a pseudonym for the Duchess Colonna, the author of two busts of Marie Antoinette, and other works,—has just had a sad mishap. She had sent to Paris, from Rome, a statue to be cast in bronze by one of the best French artists. This work has arrived broken to pieces. The duchess has thus lost a year's labour.

The Treatment of Sewage with Carbon. Mr. R. Hinde, of Lancaster, writes us, pointing attention to the fact, corroborated by a reprint from the *Lancaster Guardian*, as to proceedings in 1849, that at that time he had not only proposed the treatment of sewage with carbon, but had successfully practised the process at Lancaster. Neither does Mr. Hinde claim the origination of the process, but names Mr. Jasper W. Rogers, and Mr. Clarke, a London manure manufacturer, as having claimed it at that time. These names, and especially that of Mr. Jasper Rogers, many of our readers will remember in this connexion. Mr. Hinde, therefore, does not understand why a process such as that described by Mr. Johnson as having been tried at Newcastle should have been patented.

Opening of Public Baths for Stroud.—The public baths just provided for Stroud by a company headed by Mr. Dickinson, M.P., are now practically open. The Turkish bath is heated on a patent principle, providing a constant supply of fresh air from without, which, in passing through the warming apparatus, can be heated to any temperature up to 200 degrees. Under this principle of heating the oppression usually experienced by persons in most Turkish baths is said to be avoided. The swimming-bath is fitted with a shower in its centre, which keeps the water in continual motion. The cost of the baths is about 1,500*l*.; the subscriptions from shares and donations amount to 750*l*.; and there is therefore a deficiency of 750*l*.

Strike in the Building Trade in Edinburgh.—Messrs. Beattie & Sons, while building under contract the new city poorhouse at Craiglockhart, were met with a demand on the part of the men for an increase of a farthing per hour in their rate of pay. The masons were then receiving 6½d. per hour, and 6½d. was demanded. As the Messrs. Beattie were, in terms of their contract, compelled to have the poorhouse erected within a specified time, they acceded to the demand of their men. The poorhouse is now finished, and a few weeks ago Messrs. Beattie intimated that they would again reduce the rate of pay to 6½d. per hour. The men objected, and about 130 have struck work.

Society for the Encouragement of the Fine Arts.—The first *conversazione* for the season was held on Thursday evening, 27th inst., in the Gallery of the Female School of Art, Queen-square, Bloomsbury. On the 10th of February Mr. Hyde Clarke will lecture on the Culture of the Fine Arts in its influence on industrial pursuits.

Wanton Mischief.—A few nights since a gang of roughs smashed the stained-glass window and otherwise damaged the edifice of Heath Church, near Leighton Buzzard, Beds: previously to this they unhinged every gate between the two places, pulled up turnips, unearthed potatoes, and threw stones into the bedroom windows of peaceful inhabitants.

Paper Houses.—The American invention for paper building material has been recently tested in Chicago, with the result, we are informed, of establishing its utility. It is said that a house, 22 ft. long, 16 ft. wide, and 14 ft. high, can be covered on the outside for less than 9 dollars; and a house 16 ft. by 22 ft., and 20 ft. high, for 20 dollars.

Columbia Market.—The twenty-four iron pillars have been erected in the centre square, and the cross-beams are already placed, and by the close of this month "the covering-in" will be completed. There will be a stand or rostrum at each of the centre pillars, for "fish auctions." The paving of the covered square will be asphalted over, and the market lighted.

Her Majesty's Board of Works.—Mr. Fergusson having resigned the office of Secretary of Works, under the Board of Works, it has been resolved to make new arrangements respecting the works and buildings in connexion with the public service. Capt. Galton, C.B., F.R.S., has been appointed to the office of Director of Works.

Art Workmanship Competition at the Society of Arts.—In response to the offer of prizes issued by the Council in 1869, 143 specimens have been received for competition in the various subjects for which the prizes have been offered. These articles will shortly be arranged for exhibition in the Society's great room.

The Royal Irish Academy, at their last meeting, according to *Nature*, approved of some alterations in the bye-laws proposed by the council. By these alterations the council for the future will be divided into two committees, one of science, consisting of eleven members, and one of Polite Literature and Antiquities, consisting of ten members. The Committee of Publication is to consist of four members from each of the Committees of Council.

The "Danger of Introducing" Painted Windows.—The prize for the best essay "On the Use and Abuse of Music in Public Worship, and the Danger of Introducing Painted Windows in Churches," has been awarded to the Rev. J. Gritton, secretary to the Lord's Day Observance Society.

The Utilisation of Sewage.—This question has been again discussed at the Surveyors' Institute. A general opinion was expressed that the application of town sewage to land would ultimately be found the most advantageous way of meeting a difficulty which has so long existed.

The Subway, Westminster Bridge.—We may as well add to the information given in our last under the heading "Works at the Houses of Parliament," that to render the subway damp-proof in every respect, it was encased in Pyrimont asphalte.

The Greek Church, Liverpool. — Mr. Sumners has sent us copy of correspondence on the subject of the authorship of the design of this building. It shall have attention when we give particulars of the church.

The Queen's Library.—It is understood that Mr. R. Holmes, of the British Museum, will obtain the appointment of librarian to the Queen, vacant by the death of Mr. Woodward. We believe the candidates were numerous.

St. Mary's, Mistley.—The work in marble and alabaster, and the carving in this church, were executed by Messrs. Chinnock & Co., Ipswich. The pulpit and font are well spoken of.

TENDERS.

For alterations and additions to the Baptist Chapel, Silver-street, Taunton. Mr. J. H. Smith, architect :—

Aplin	£840	0	0
Dinham & Manning	736	0	0
Giles	698	0	0

For alterations at the Duke's Head Hotel, Margate, for Mr. J. Sharpe. Mr. W. Lane Sear, architect :—

Bushell & Son	£1,362	0	0

For building a photographic studio at Margate, for Mr. H. Goodman. Mr. W. Lane Sear, architect :—

Wharton	£749	0	0
Bushell & Son	608	0	0
Sayer	550	0	0

For partly rebuilding the Britannia Inn at Margate, for Messrs. Cobb & Co. Mr. W. Lane Sear, architect :—

Shrubsole	£698	0	0
Brown & Son	640	0	0
Simmons	635	0	0
Bushell & Son (accepted)	480	0	0
Hayward	477	0	0

For erection of baths and assembly rooms, at Southsea, Hants, for the Southsea Baths and Rooms Company (Limited). Messrs. Davis & Emanuel, architects :—

For Builder's Work.

Doverwood & Co.	£12,424	0	0
Bramble, Brothers	10,250	0	0
Pook	9,920	0	0
Nightingale	9,876	0	0
Stevens	9,548	0	0
Larcome	9,358	0	0
Burbidge	9,186	0	0
Quick	9,153	0	0
Ward	9,079	0	0
Absalom	8,850	0	0
W. R. & C. Light	8,651	0	0
Sanders	8,499	0	0
Barnes	8,370	0	0
Neave & Fry	8,333	0	0
Nance	8,250	0	0
Smith	7,395	0	0

For Engineer's Work.

Rigg	£2,576	12	7
Phipson	2,080	12	0
Bacon & Co.	1,978	0	0
Truss	1,945	0	0
Jennings	1,725	0	0
Topham & Co.	1,640	6	8
Jukes, Coulson, Stokes, & Co.	1,607	0	0
Gimson & Co.	1,428	0	0
Grant	1,028	0	0

For the erection of stabling in rear of the Adam and Eve Tavern, No. 1, Hampstead-road, Messrs. Richardson & Waghorn, architects :—

Scrivener & White (accepted)	£2,059	0	0

For the erection of stabling in rear of Nos. 19 & 21, Hampstead-road. Messrs. Richardson & Waghorn, architects :—

Merritt & Ashby (accepted)	£1,080	0	0

For alterations and repairs to No. 48, Portland-place. Mr. W. A. Baker, architect. Quantities by Messrs. Richardson & Waghorn :—

Haward, Brothers	£3,900	0	0
Clark & Mannooch	3,479	0	0
Keyes & Head	3,335	0	0
Simpson & Son	3,380	0	0
Phillips & Son	3,267	0	0
Ebbs & Son	3,249	0	0

For alterations and repairs to No. 85, Harley-street. Mr. W. A. Baker, architect. Quantities prepared by Messrs. Richardson & Waghorn :—

Cowland	£1,416	0	0

Sundry repairs, &c., to premises at Limehouse. Mr. S. G. Foulkes, architect :—

Woodward	£390	0	0
Brown (accepted)	260	0	0

For additions to Elm Lodge, Surbiton, for Mr. C. Owtram. Messrs. T. H. Rushforth & C. L. Luck, architects. Quantities supplied by Mr. Northcroft :—

Johnson & Gilby	£1,815	15	3
Dove, Brothers	1,655	0	0
Haward, Brothers	1,654	0	0
Simpson	1,600	0	0
Gammon & Son	1,566	0	0
Higgs	1,540	0	0
Manley & Rogers	1,477	0	0
Foster	1,466	0	0

For alterations and additions to No. 1, Copthall-court, Throgmorton-street, City, for Mr. H. Solomon. Mr. B. Tabberer, architect :—

Larke	£728	0	0
Whittingham	674	0	0
Crabb & Vaughan	663	0	0
Sergeant	660	0	0
Prince	630	0	0

For new cemetery at Bristol. Mr. H. Masters, architect :—

Buildings, Roads, and Boundaries.

Davis & Son	£5,895	0	0
Diment*	5,848	0	0
Storkey	5,800	0	0
Eastabrook & Son	5,620	0	0
Wilkins & Son	5,555	0	0
Baker*	5,550	0	0
Kingstone*	5,492	0	0
Beven & Son	4,998	0	0
Brown	4,799	0	0
Stevens	4,686	0	0
Brock (accepted)	4,532	0	0

Planting, &c.

Maul & Sons	£248	0	0
Sealey & Son	160	0	0
Nelson (accepted)	133	0	0
Garraway & Co.*	130	0	0

* Informal.

For restoration of cooperage destroyed by fire, in Marine-street, Bermondsey, for Mr. David Bradford. Mr. G. J. Loé, architect :—

Haben	£719	10	0
Crabb & Vaughan	549	0	0
Morter	545	0	0
Edwards	515	0	0
Machin	484	14	0

For Islington New Workhouse, St. John's-road, Upper Holloway. Mr. R. H. Burden, architect :—

Hot-water and Steam-Boilers, Engine, and Laundry Fittings.

Turner & Co.	£1,678	8	0
Cottam & Co.	1,650	0	0
Hodge & Sons	1,550	0	0
Fraser & Sons	1,495	0	0
Benham	1,467	0	0
Jeakes & Co (accepted)	1,323	0	0

Lifts to Main House and Infirmary Buildings.

Benham & Sons	£230	0	0
Bunnett & Co.	200	0	0
Jeakes & Co. (accepted)	188	0	0

External Hydrants.

Jeakes & Co. (accepted)	132	0	0

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We are compelled to decline pointing out books and giving addresses.

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The Builder.

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Truth to Nature in Art.

HOW can we consistently interpret,—what is meant by,—the ascription to the beautiful in art of uniform and conspicuous truthfulness to nature, considering our experience that the beautiful belongs so definitely to the realm of imagination as contrasted with that of reality, that when beautiful things do not appear to descend at once from the region of pure fancy and invention, it seems ever only because imagination herself has descended, and carries upwards whatever of reality she grasps hold of into her own supersensual realm.

The beauty of the real seems thus to depend on a glory conferred from the imaginary; and yet, on the other hand, the imagined, however wild and free its apparent range, is ever recalled to a certain, nay, to a strict, admission of the rights of reality, and at last has to find its degree of success taken as an absolute measure of its truthfulness to nature.

There is very much indeed dependent on the right adjustment of these relative claims and interests; their creative concert is otherwise liable to be misconceived,—misrepresented under plausible earnestness and colourable conscientiousness, or transformed through false deductions into destructive conflict.

It is in this manner that the exercise of imagination is most unfairly and injuriously held down to processes that, as dogmatically enjoined, were more fitly addressed to pure scientific intellect or to the blankest handicrafts. Beauty, the student is sometimes told with authority, is to be achieved by earnest work, by minute application; a work of beauty has to be thoroughly "thought out;" the result it is affirmed and promised, if these conditions are fulfilled, will be in direct, in calculable, proportion to the labour and mind employed, mind being ever assumed to be at the command of and subject to will.

So far as this language is held with a view to correct an over-tendency to idleness by an over-strain in the direction of industry, we may leave its correction to Aristotle's counter vindication of veracity in education in the last paragraph of his Ethics. Otherwise, the doctrine that insists on the duty and profit of minute conscientious copy as the primary and the ultimate, has to correct itself as gracefully as it may when confronted by its own results, and to qualify its precepts very materially thereafter. Selection, the pupil is now told, is to be made; the best of nature is best worth copying, and regard being had to the brevity of life, time cannot be spared for other than the best.

But again, the best effects of nature will not stay to be copied; it is often much if they will even tarry to be very minutely scrutinised: an effect of light in a landscape, of expression in a face, of grace in a movement, has to be caught in mid flight,—caught and retained. And so the most scrupulous student must refer to his memory for much of the reflected image of nature that he is to copy, and the more vivid the image he recovers, the less certain will he often be how much of it is due to pure memory and how much to interference of another power,—jealous of her rights as against both memory and senses,—the power of imagination,—imagination that repudiates set copies and models, and is even chary of admitting allegiance to specific experience and observation.

These difficulties are combated with ingenuity and pertinacity no doubt in some of the arts, by posing models, building up back-grounds, regulating north lights, adjusting casts of drapery, and so forth; but whatever success may be obtained in so fixing the fleeting, it will be relatively unimportant. The best and most expressive emanations of nature defy such fetters, and the artist who puts his exclusive or chief trust in such resources, is simply restricting himself, contentedly or unawares, within limits of the moderate in beauty and the subordinate in art.

But in any case, when once the student, awakened to his privilege, or bowing to necessity, applies himself to make a selection from nature,—to pick and choose, adopt and reject,—he cannot be withheld from asserting a further extension of independence. He fairly claims to be no less true to nature,—true, indeed, in a nobler sense, if he embodies not merely what nature has done, but anything whatsoever for which her powers are competent. He is bold to combine effects which, severally, are true to nature, and of which the combination is counter to no natural law, though it may never have occurred within his observation. He places a tree in a landscape where no tree grows, but where there is no inconsistency in supposing that it might have grown. He removes a mountain in the faith that the reversal of its aspect involves no contradiction. A conversation is ascribed to two historic personages which it is certain they never did hold—though they might have held it had they chosen, and been so disposed. A series of incidents are related as occurring in close succession, and so aptly, and to such a peculiar and assorted set of people, that it would be vain to dream of justifying precedents; and yet no law of nature need be positively transgressed through the whole story. Othello, Iago, Desdemona, Emilia, Cassio, are all severally possible, but what shall we say of the chance that brought together precisely the kind of people under the precise circumstances that were requisite to draw forth such a complete exhibition of the passion of jealousy?

Even so it becomes manifest that while we are professedly restricting ourselves to what nature might do or might have done, we are taking very arbitrary liberties with her proceedings. Be our picture historical or idyllic, it will most certainly comprise objects and collocations that are at variance with matter of fact. We are true to nature,—at best with a reservation,—not literally and historically true, but true in the sense of consistency with natural laws as independent of history;—true it may, perhaps, be within the limits of probability: we may represent what is likely to have been; or what, at least, is not grossly unlikely; or, by a still larger extension of our freedom, what, however unlikely, is still within the wide range of possibility.

So it becomes clear that art in any form, and art of any value—and with this only we are concerned,—cannot be restricted to matter-of-fact nature, and, indeed, is scarcely attainable unless under certain indulgences and conventions. We have to agree,—from childhood upwards we have been accustomed to agree,—not to stickle for the matter of fact in points where actuality has no bearing of importance on the general conception that interests us. The scope of the convention required and demanded has endless variations; it may be considered as standing at the commencement of the work. It is in the artist's mind, at least, like the signature of a musical key, and fiction is only justly denounced when grossly out of keeping in parts with the scale of probability postulated throughout, or when failure of interesting result excites indignation at abuse of an indulgence conceded in vain.

Mere degrees of divergence from the facts of nature in particular points decides nothing,—can decide nothing, when we have once agreed that art is competent to clear at a bound even the ring-fence of the possible. The laws of time and space are set aside by the best artists without hesitation. The same picture shows Abram at the foot of the hill, ascending it, and at the top; shows the Transfiguration on the summit of the mountain, and no less visibly the difficulties around the demoniac boy at the base. Racine crowds into half a day the interests and feelings of half a lifetime. Shakspeare follows a lifetime from scene to scene, from one continent to another and back again, or calls upon us to acquiesce in a lapse of days, even while a scene has remained unchanged, and the stage has never been unoccupied.

As, then, it seems in truth to be only in virtue of certain primary conventions that art becomes possible,—to an extension of these, also, does it owe its emancipation,—and by them escaping from trammels, finds the noblest sphere of its activity opened, though, doubtless, at the same time, temptations to lapse and liabilities to abuse.

Just as in a pure historical composition it is permissible to omit a multitude of details in themselves important, provided they can be correctly and satisfactorily summarised; so also in art, any natural restrictions whatever may be overleaped, provided a chief and worthy effect is worthily set forth. But the worthiness of the result must bear some proportion to the liberty taken; and it is in this result that the imperative, the indispensable truth to nature has to be looked for and realised.

And art has, therefore, a faculty and function of generalisation analogous in its way to that of science, the very ground on which Aristotle declared poetry to be more philosophical than history.

The more highly idealised the work of art, the more of the truth of nature does it concentrate, albeit the more decisive may be its breach with the limitation of ordinary nature.

Art, even in the simplest case of selection, tampers with nature for the sake of effect—tampers, that is, with the laws of probability—and does so to an extent that involves the absolutely impossible; not, however, the impossible under the conceded postulates, in virtue of which new laws of Nature are imposed and enacted.

What manner of changes are admissible, and for what end?

Enhanced force is arrogated for certain laws of Nature by deliberate reduction, if not suppression, of others.

Achilles shouts loud enough to alarm an entire army; Ulysses swims nine days and nine nights without pause or refreshment; the muscles of the Farnese Hercules receive superhuman development; the usurping Duke, in "As you like it," meets with a religious man, and straightway and suddenly retires to a cell a convertite.

Certain qualities and sets of qualities which by their coherence relatively to an end are characteristic, are enhanced—enhanced by reduction or obliteration of conflicting powers. Nature, we say, is thus elevated—is idealised. We read that Brutus, out of patriotism, ordered his own son to execution. If the fact is true, it is of heroic type; if an invention, it is ideal.

Art, whatever licence it enjoys, can still but be the minister and interpreter of nature. Nature supplies at last the entire fund of its

materials. Hence, if it transgresses and alters nature in one direction, it can only be to give greater brilliancy to her operations in others.

Hence art is bound to give the effect of naturalness to the very representation that involves such a breach with her important laws. It is bound to produce such exquisiteness of result as shall conciliate our approval of the liberty, blind us to all suspicion of untruthfulness, impress us for the time with most satisfied sense of consistency, of naturalness under the assumed conditions.

Art has the function to make manifestations of Nature's laws, that under existing circumstances are impossible, appear under convention of assumed circumstances, perfectly natural, consistent, and, in fact, highly illustrative of the operation of those laws as they really exist, by exposition of their tendencies under freer relations, released from limiting coercion, favoured by every imaginable advantage.

Gulliver's travels are as full of truth to nature as Robinson Crusoe's,—a mythological fiction of Rubens as one of his Flemish landscapes,—"Midsummer Night's Dream" as "Merry Wives of Windsor."

To idealise, then, though by mere process of omission of the insignificant or the detrimental, is in effect to exaggerate,—using the word, and we must conceive this to be possible, in an inoffensive sense. Still more distinctly is this the case, of course, when magnitudes and intensities of qualities,—of gross material bulk and force, colours, &c.,—or of sensitive mind, its energies and passions,—are modified, whether by reduction or increment.

For exaggeration,—the word being thus used with difficulty in a better sense,—we may substitute enhancement or emphasis, emphasis which adds force adroitly to one portion of an enunciation of which all may be alike indispensable, though due to be variously subordinated.

We come to much the same result if we approach the subject from another side.

What advantages do we gain? what, rather, do we not gain by these concessions in respect of literal nature for the sake of art?

Permanence is a chief; the artistic conventions enable us to fix for continued enjoyment the beautiful effects that in nature must needs be fleeting—transitory.

This is in itself exaggeration, extension of a quality beyond the fact of nature; it involves the first of all conventions, and is ever accepted as a matter of course.

By convention as indispensable we are enabled to achieve *purity* of effect, of which a condition is the unhesitating suppression of details that would distract attention from, interfere with, or countervail the beauty of the manifestations we are interested in; occasion, again, for abundant license and liberal condonations, exclusion of the incongruous,—the indifferent.

Distinctness, characteristic definition, again, so far as this is not involved in the conditions of purity, is attained by the development and elaboration of members and details to a degree and in a manner corresponding with their relation to expressiveness. Ornament has its root-hold here, and blooms and bourgeons in the free atmosphere of fancy and imagination with fullest foliage and flowers exhaustless in variety.

Such are the conditions of the ideal, its relations to Nature,—source of all truth,—its own title to acceptance and admiration.

But, it must not be disguised, that of the Nature which art lavishly concentrates in the most idealised work of art, there will ever—will often, at least—be much that, while manifestly expressing the uttermost truthfulness, it will not be easy to trace home to Nature. We might almost as reasonably sometimes hope to find the colour of the rose either in the ground it roots upon, or the gases it absorbs from the air around it.

The functions of imagination are very wonderful indeed. It is not merely that the mind appears to absorb the elements it works on from the world without by observation and experience,—to resolve, recast, reunite them into new forms, while they still, more or less, bear traces of their origin. Imagination does something more than help the artist, as a nurse might help a child to put together the scenes and figures of a toy theatre in new combinations. The seeds of beauty and expression seem to germinate within the mind spontaneously,—to be the almost independent outgrowth of our faculties that are part of nature as much as the external world—as, in fact, their immediate organs are part of the external world—that are pre-arranged to harmonise with that world, even as the ear with vibrations of the same atmosphere we breathe,—that comprise susceptibilities of passions which seem sometimes not merely dormant and ready to be awakened by arrival of appropriate stimulus, but restless already, and imagining in dreams the food that is to satisfy them.

The phenomena of the exceptionally precocious exemplify the existence and nature of this power of imagination with more certainty than it can be traced in the more developed, where its operation must necessarily be occult and overlaid, if not weakened. Child actors have been known to represent with wonderful truthfulness a variety of passions that they never can have felt,—every phase of moral disturbance that agitates the ambitious, the enamoured, the jealous, the remorseful. Imitation and instruction are out of the question; the function of all but independent imagination in these otherwise unimportant vagaries of nature is as palpable as when Shakspeare himself divines the working of the madness of Lear or Ophelia, or the miserably-bereaved maternity of Lady Constance.

The culture, then, under which imagination most favourably brings forth its fruits seems to lean jointly, if not equally, on the spontaneous suggestions of Nature, and that sedulous study that peculiarly pertains to art. The logical and directive faculty of the mind must by no means be dormant, even when contemplation seems drinking in impressions freely ministered by Nature. The unbidden suggestions of the mind that come like strangers must have a stranger's welcome, scrutinised in some cases critically,—in others accepted as bearing on their faces the guarantees of sincerity, dignity and worth.

Thus art stretches itself beyond its first ambition to fix the fleeting beauty that it catches momentarily in nature, and seeks to purify it by elimination of intrusive elements, and to correct it by duly adjusting the balance of obtrusiveness between part and part, by enhancing or subordinating glory and glory, and so completing an ordered and harmonious whole over which the contemplating mind may range undisturbed by the incongruous, and within whose limits it may linger unoppressed by sense of checking limitation.

To take an illustration from the art of architecture,—so we are brought round to our leading interest and thought,—at its commencement it subserves one of our commonest needs, protection from weather; the mere shelter of sufficient permanence receives from art still greater strength and solidity; it is cleared progressively of inconveniences, obstructions, and superfluous material, and at last receives an elaboration of its parts into distinct members subserving and expressive of functions of enclosure, of support, or covering, base or impost, column or groin rib, and the lighter surface decoration that implies consideration for contact. So at last it submits itself to a general law of dominant order that answers to and declares an organised purpose and order within. When enrichment and ornament supervene, they come to tend appropriate, but still free and graceful, service, to veil whatever coarseness will cling to mere construction, to supply vent for the pleasurable feelings that spring up in the leisure that ensues when need alike and intelligence are satisfied. The roots of ethics and of art are very closely intertwined, lie very close together in our deepest and noblest nature, and the principle is common to both—

> "Oh, reason not the need! our basest beggars
> Are in the poorest thing superfluous;
> Allow not Nature more than Nature needs:
> Man's life is cheap as beast's."

THE MATERIALS FOR ECONOMIC DWELLING-HOUSES.

IN any well-ordered attempt to lay the foundations of a general system of economic dwellings, in which cheapness shall be combined with the conditions requisite to health and comfort, one of the first considerations is that of the best materials for the main portions of the structure. Shelter is the first advantage sought for in a house. For shelter to be perfect, it must be such as to render the inmates to a great degree independent of the rapid and violent changes to which our climate is exposed. Roof, walls, and floor should be not only so constructed as to resist the fury of the winds, the down-pour, or drift of rain or sleet, the exudation of percolating water, but further to keep out the extreme cold of winter, and the excesive heat of summer. Very different, although not inconsistent, properties are therefore requisite in the materials in question. That they should be non-absorbent is of the first importance. But there are natural substances highly valuable for their non-absorbent qualities, such as slate, which afford little protection against great variations of temperature. Other materials, which have long been regarded with favour as good non-conductors of heat, are objectionable from their absorbent qualities. And in this respect it must be borne in mind that there are two sorts of absorption, the first of which, indeed, is hostile to comfort, as well as to health; while the second, less obnoxious to the senses, is far more pernicious, and even fatal, to the inhabitant. We refer to the absorption and re-emission of damp, and the absorption and re-emission of miasma, or the effluvia and seeds of disease.

The power of materials to resist the percolation of damp requires to be tested by experiment. The large Government smithery in Pembroke Dockyard was built of very excellent rubble work, consisting of limestone from the local bed, as hard as granite, and Aberthaw (hydraulic) mortar. The walls were 3 ft. thick. But when the rain-bearing west wind, so prevalent in that part of Wales, set in with fury, water ran down on the inside of these walls, as if they had been actually porous. It was probably the case that the limestone parted with the water which it held, by a sort of endosmose, towards the dryer air within, supplying its place from the copious store of wet without. However this might be, the effect, when the building was new, was as if the rain had actually beaten through the wall.

Those who visit the common crowded dwellings of the wage class in our towns, even when they are unoccupied, are aware that the walls have a peculiar depressing, musty, or fœtid smell. On visits after severe epidemic attacks, in some of these dwellings a peculiarly offensive smell has been perceived, and on inquiry what that could possibly be from, the answer has been that it was the "dead man's smell," the dead body had been too long kept near the wall in a state of decomposition, before it could be removed for interment, and the fœtor adhered to the wall. Fever is propagated with unerring certitude by uncleansed, absorbent walls. The French writers on sanitary subjects lay unusual stress on the absorption of damp and on *méphitisme*. All emanations of the body, even when acute disease is absent, attach themselves to walls, as well as to clothes, and more particularly to walls of porous stone. M. Devey, in his work on "Hygiène de Famille," states that ventilation has comparatively little effect on the *méphitisme* of walls. Disinfecting vapours may purify the atmosphere; but they fail to remove the infection imbibed by the walls. No satisfactory analysis has hitherto been made of this mephitic affection of a dwelling-house; but M. Devey declares that "it is certain that there exists, according to the energetic and picturesque expression of Moses, the plague of leprosy in a house." The minute detail traced with such unerring precision 3,400 years ago, might be placed even here with advantage in the hands of our sanitary inspectors. "If the plague be in the walls of a house with hollow strakes, greenish or reddish, which in sight are lower than the wall," the house was to be closed for seven days. If, at the expiration of that time the distemper had spread, the carious stones were to be removed, the house was to be "scraped within round about," and to be plastered with fresh mortar. If the menacing symptom again appeared, the house was to be demolished, and the materials removed from the City "to an unclean place." If the cleansing stopped the distemper, the house was to be fumigated with burnt cedar before it was again inhabited.

Diseases of all, or, at all events, of very various kinds, are apt to cast seed, and to take root, in absorbent walls. When the cleansing of hospital walls, in this country, has been too long delayed, there are several instances known, in which every workman who was engaged in the operation was taken ill. Doctor Sainte Marie states, that he attended a patient who died of gangrene. Two years afterwards he attended another patient in the same place, and perceived the peculiar odour of gangrene, which is unmistakable. At Lyons puerperal fever broke out in a hospital. Fifteen or sixteen women fell victims within a few days. The ward was emptied, and the plaster was removed. The fetid odour that escaped during the process was

worse than that of the dissecting-room. When the ward was restored to a proper state, the epidemic disappeared. Fever, cancer, gangrene, all infective maladies, are propagated by infected walls. In large towns, especially in ancient quarters, mephitism has become endemic, and its presence may be recognised by any one.

Walls of lath and plaster, especially when papered, are eminently liable to this dangerous mode of infection. In the model dwelling-houses of Miss Burdett Coutts, Mr. Peabody, and some others, the walls have been left without either paper or plaster, in order to be lime-washed twice a year. These bare brick walls, presenting certainly as unpicturesque a surface as any on which the eye can rest, are greatly disliked by the inhabitants. The English working classes especially abhor that invasion of their freedom, which not only finishes their dwelling-rooms in a manner appropriate to a coach-house or stable of a humble character, but further insists on poking into their privacy every three or four months, the unasked visitor being followed by a man with a brush and a pot of whitewash. The aboriginal Celtic pig-sty, if it verified the proud boast of the orator, "the King of England cannot enter it," would be preferred by nine working men out of ten, to a healthy but,—to their views,—humiliating, interior, kept obtrusively clean and white.

It is of little use for us to attempt, on the one hand, to initiate and to cultivate æsthetic perceptions among the rising generation of our industrial classes, while on the other hand we strive to house them in bare barracks, and insist on the unsightly. We must ascertain what is demanded for health, and we must then turn our attention to combine, with the fulfilment of that first requisite, something that will be consistent with good taste, and even with simple elegance. The first requisite will be attained by a surface that is non-absorbent and washable. There can be no good reason why such a surface should be offensive to the eye.

For the purpose of rendering walls bad conductors of heat, and thus of enhancing the comfort, protecting the health, and diminishing (in winter) the quantity of fuel consumed, the use of hollow bricks, jointed tiles, or walls so constructed as to include a film of air between the interior and the exterior of the dwelling, have advantages if proper execution can be assured. But ordinary bricks are extremely absorbent. A single brick will absorb as much as a pint of water. Sandstone, such as is often used for building purposes, may contain half a gallon of water in a cubic foot, and Professor Ansted states that even dry granite contains as much as a pint and a half of water in a cubic foot. In porous walls wet ascends from the foundations by capillary attraction. If the cleanliness for which the Dutch housewives are so famous be insisted on, and if the face of these walls be subjected to the copious and frequent ablutions which are required to prevent mephitic infection, especially in crowded localities, we are thus at the same time sowing broadcast the seeds of rheumatism and other diseases that are aggravated by damp.

The remedy that should be sought is twofold. We require impervious bricks and impervious cement. We require to free our building industry from the tyranny of the brick-makers. Our ordinary stock bricks are, in this present year of grace 1870, probably the worst in the world. They are such as no engineer or architect, worthy of the title, would have allowed to be delivered on any works under his direction five-and-twenty years ago. We can trace an incredible deterioration in this respect within the limits of our own personal experience. We are certain that if a single load of such bricks as formed the main portion of one of the largest works completed in London during the past year, had been delivered, say upon the works of the London and Birmingham Railway in 1835, or of the Great Western Railway a few years later, they would not only have been instantly removed by the orders of the engineer, at the expense of the contractors, but the latter would have become very unpleasantly aware of the light in which any attempt to use such shapeless lumps would have been dealt with by Mr. Stephenson or Mr. Brunel. Not that the stocks in question were unsound. They were hard enough, in all conscience; but their utter shapelessness was such as to unfit them for any properly coursed work. "They are such as every one makes now," said the clerk of the works.

The truth is, that we are very far from realising how far one of the most important branches of industry in the United Kingdom is regulated by the blind obstinacy of those members of the craft who do not rise to the rank of journeymen, or even of apprentices. If any man familiar with the working classes were asked to point out the class of men who had most reason to be discontented with their present condition, most to hope for from anything that should raise their daily occupation by the education of skill, or by the aid of machinery, and who ought, therefore, to be most anxious for change, he would probably name the moulders of bricks. The labour of the brick-moulder would seem to be that which, of all others, is the most onerous and painful to the labourer. The work is very hard. The exertion of muscular strength required for dashing each lump of clay into the mould is considerable. It has to be repeated, with unremitting frequency, during the entire day, varied only by other mechanical movements, each of which is performed with hurried rapidity. The position of the work-shed,—shop it cannot be called,—is almost invariably damp, low, dispiriting, and unhealthy. The workman is exposed to the inclemency and caprice of the weather, when he is able to work, and is further exposed to long periods of enforced idleness, when the season is not such as to permit of the prosecution of any of the series of processes which are carried on in the open air. The person and attire of the moulder is normally in the most filthy state, plastered with clay, in all stages of dampness, from the fresh spirt of the minute, to the dried clot of which it is impossible to ascertain the unbrushed antiquity. Yet it is precisely these men who have resisted, with a savage ferocity to which the annals of labour show few parallels, every attempt to perform the sheer brutal labour, from which one would think they would so rejoice to be set free, by mechanical aid. There can be no doubt, in the mind of any competent judge, that good bricks could be more rapidly and more cheaply made by machinery than bad bricks are now made by hand. There can be no doubt that the welfare of all those who now take part in the labour of brickmaking would be served by the introduction of machinery. The manufacture would occupy a higher place in the social scale, production would receive an impetus, and decent labourers, with sheltered workplaces, would in a very little time take the place of the mud-stained savages of our existing brick-fields. Yet it is in defence of this wretched state of slavery,—a state which in old times was enforced by stripes and blows on the members of a subjugated race,—that our brick-moulders put needles in the clay, and resist improvement by threats, and not vain threats, of murder.

Not only the bricklayer, but the whole industry of the builder, suffers from this obstinate resolve of the brickmaker. Nothing, at this moment, has so powerful an influence in producing the discomfort of the houses of our labouring classes as the cost and bad quality of bricks. The better and more expensive class of bricks are, so far as our information extends, becoming yearly more rare, more dear, and less satisfactory. There are exceptions to this censure; but it must be remembered that the utilisation of the best beds of plastic clay, such as we find in Dorsetshire, in Devonshire, in Cornwall, at Belleek in Ireland, and in other places, is checked to a great extent by the expense of land carriage. Birmingham, Manchester, London itself, are the great consumers, and it is for these ever open markets that stiff clay and breeze are hurried into those shapeless, colourless, absorbent lumps that we now call bricks.

Some of the manufacturers of this country have turned patient and enlightened attention to the improvement of the manufacture of earthenware for building purposes. The State, or at least the Legislature of this country, was for a long period the most oppressive and most formidable enemy to anything like sanitary, economical, æsthetic architecture. It compelled those who built for the poor man to keep him in unwholesome darkness in order to avoid the window tax; and it prevented any improvement in bricks, by the constant watch of the exciseman. Happily these stigmas to the civilisation of the nineteenth century no longer disgrace our statute book. But it is more easy to commit an injury than to repair it. And although, for purely ornamental purposes, as well as for the manufacture of tiles, chimney pots, and other articles of building earthenware entirely beyond the power of the ordinary moulder to fabricate ever so roughly, we find that manufactures deserving very respectful mention have been established, yet in the grand industry of brickmaking proper reform is still successfully impeded.

Health, beauty, and durability are no trifles. They are impossible in a low-priced house, built of our present ordinary bricks. They would be normal in a well-designed small house, built of such well-formed, well-burned, well-arranged *tesseræ* as a very little effort would produce.

The abolition of the excise leaves us no excuse for a rigid adherence to the old legal form of brick, 9 in. by 4½ in., by 3 in., or as near thereto as the different shrinkage of every possible character of clay allows them to issue from the kiln. Our masters in building and our teachers in brickmaking used bricks of a far different form, approaching more nearly to what we call tiles. But the Romans, whether it were for engineering or for artistic reasons, were not in the habit of building lofty walls of one material or of one bond. We find brick courses interposed in rubble walls, that have defied the lapse of eighteen and of five-and-twenty centuries; and in cases where the want of stone was felt, and brick was resorted to as the sole material, we find interposed layers of *opus lateritium*, or coursed work, composed of a sort of tiles, from ⅝ in. to 1¼ in. thick, and of *opus reticulatum*, or network, in which the depth and the width of each brick are equal, and the angles are placed vertically.

In interior walls, and indeed for surfaces exposed to the weather, one end and one side of the bricks should be covered with a vitreous glaze. By using good cement the question of absorption would thus at once be set at rest. Walls might be washed within, and rained upon without, and yet absorb no more damp than a window. Nor need ornamentation be neglected. We have long been familiar with Dutch tiles. We have at South Kensington a few specimens of Moorish, Persian, and other Oriental wall tiles, in which a considerable amount of artistic beauty is combined with impermeability. In the Royal Palace of Cintra is an apartment entirely lined with tiles, a room which, by turning a handle, may be converted into a sort of shower-bath. But in all cases where a flat casing is built edgeways as the lining of a wall, a double expense is incurred, or stability is endangered.

The 3-in. bricks might readily be so ornamented as to form part of a design. This is done with encaustic tiles; it has been done, on a very large scale, by the Della Robbia family, with their enamelled and moulded pottery.

But we possess, in the command of liquid fuel and of gas, a power far beyond the wildest dreams of Andrea della Robbia or of Bernard Palissy. The chief difficulty with those early makers of enamelled earthenware was in the furnace. Every piece of majolica (enamelled ware) had to be fired twice. The management of the fire was a matter demanding the nicest care, and the more so because different degrees of heat affected various substances used as pigments in a different manner. But we have records of past experience. We have the history of the earliest manufacture of enamelled earthenware (an interesting Italian autograph volume, by Picciolpasso, is in the Art Library), and we have the experience of the work of the present century. It is possible to compound a glaze that shall be fusible at a given heat. It is not, therefore, easy to say why this glaze should not be applied to a wall, *in situ*, and glazed by the application of a large salamander, or iron plate, kept at a red heat by gas.

By this method we might supply a great want of this country—the means of wall decoration, that should be at once graceful and permanent, and that should depend for its beauty rather on the touch of a real artist than upon extraordinary outlay. Fresco seems to be denied to us. A few years turn our more ambitious attempts into hideous grimness. Water-glass weeps itself away. But if, on a surface which renders necessary, by its state when painted on, that breadth of handling and freedom of touch which we see brought to their fullest perfection in the large articles of majolica of Urbino or of Castel Durante, we employ the skill of the artists whom we are commencing to train, and then cover the work with an impervious glaze, by the steady and perfectly-regulated heat applied by the salamander, we shall have solved one of the great difficulties of the builder's art. We shall have invented a novel method of wall decoration, suitable to the climate, of perfect sanitary value, imperishable under ordinary usage, and calculated to awaken in our artists precisely those broad and noble characteristics which the impossibility of fresco work in England has done so much to banish even from our easel pictures. Majolica, even on domestic utensils,